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Unusual Prosthetic Restoration—*Clements*

Study in Salivary Reaction—*Gans*

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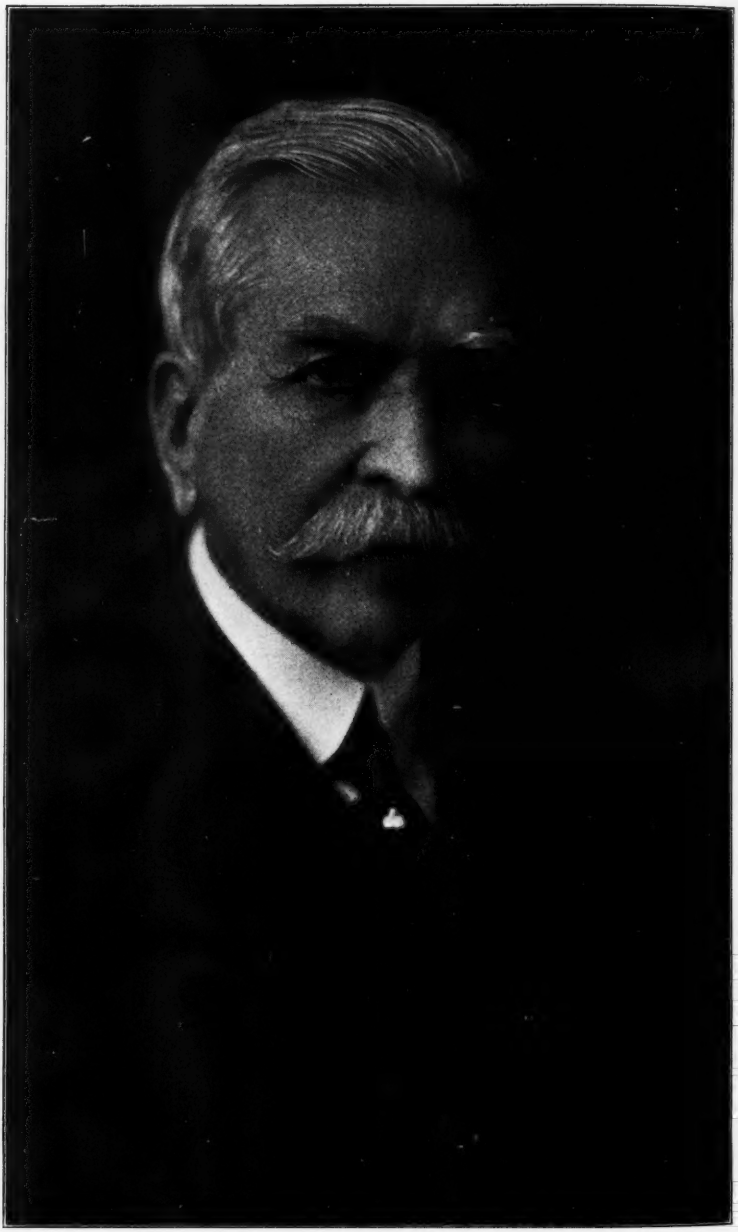

EDWARD SANFORD GAYLORD, D.D.S., New Haven, Conn.
(1840-1926)
President of the American Dental Association 1910-1911

THE JOURNAL
OF THE
American Dental Association

VOL. 13 FEBRUARY, 1926 No. 2

Original Communications

THE VALUE OF A FULL KNOWLEDGE OF OCCLUSION, WHEN CONSIDERED FROM THE STANDPOINT OF EVERYDAY PRACTICE

By H. B. WASHBURN, D.D.S., St. Paul, Minnesota

(Read before the Pennsylvania State Dental Association, Reading, Pa., May 5, 1925)

CONSIDERATION of the value of a full knowledge of occlusion, from the standpoint of everyday practice, brings forth different ideas among any group of dentists. Interpretation of this subject depends largely on personal observation and experience, coupled with other men's observations and experiences. In order to interpret the application of a knowledge of occlusion in the broadest sense possible, I shall draw from the observations and experiences of many men.

Let us first agree on a common understanding of the meaning of the term occlusion. Webster's dictionary defines occlusion in a broad way to be a closure, as might be illustrated by the approximation of the edges of a natural opening, as the eyelids. In Roget's Thesaurus are given many synonyms for the word occlusion: closure, shutting up, clinched, hermatically sealed, etc.

Turning our attention to the application of the word occlusion to teeth in the human mouth, we observe, in all textbooks wherein tooth surfaces are described, that the surface of the bicuspid and molar teeth that comes in contact with a like surface in the opposing jaw is known as the occlusal surface. From this, we are justified in assuming that the early investigators in this field who were responsible for the terms we now use to designate tooth surfaces had in mind the application of the word oc-

clusion to denote contact of the occlusal surfaces of the upper and lower teeth. There has been no serious objection to this concept, but it is a well established fact that, at the time the terms occlusal surface and occlusion were first used in dentistry, there was little if any consideration of mandibular movement as we know it today.

The point I desire to emphasize is the importance of associating occlusion with mandibular movement. The entire discussion in this paper concerns the difference between tooth occlusion in a position known as central occlusion, or rest position, and tooth occlusion in any position the jaw may take in mastication. A full knowledge of this differentiation or a complete understanding of occlusion in all its ranges forms the basis for solving many of the larger problems arising in everyday practice.

The term occlusion as used in this paper conforms to the explanation given by Dr. George S. Monson:[1]

> In referring to "occlusion" and "range of occlusion" I have reference to teeth in full occlusion and to teeth in contact in any position they may take in the act of mastication. "Articulation" and "range of articulation" have reference to the temporo-maxillary articulation; while the word "range" has reference to any position the mandible may take within the limits of the ligaments of this joint.

Dr. Monson desires to limit the meaning of the word occlusion to tooth contact and limit the word articulation to the bone contact in the joint. I hope to emphasize the significance of this definition as I proceed.

By the use of the phrase everyday practice, in the title of this paper, I desire to include all phases of dentistry. The history of dentistry, and more especially the history of the study of occlusion and mandibular movement, illustrates the logic of including all phases of dentistry in any endeavor to solve dental problems.

To date, three distinctive branches of dentistry have investigated occlusion and mandibular movement. The order in which these three groups have entered this field of investigation are: the prosthodontist, the orthodontist and the periodontist. Careful examination of the published records of the work done by these men reveals the fact that if they would all three combine their efforts, there would be great possibility of a solution of many dental problems.

In explanation of this statement, permit me to remind you that the first work with the object of an understanding of jaw movement was done by a few outstanding men in the prosthetic field, beginning with Bonwill about 1850. Following Bonwill came Walker and Luce, Gysi, Christenson, Snow, Monson, Needles and others, all of whom contributed much to our information on mandibular movement.[2] However, with the exception of Monson, all of these men were primarily interested in artificial dentures, and their investigations are colored by this fact.

The orthodontist, in his investigations, has apparently swung to the other extreme in that his concern is chiefly with teeth as units, and little consideration is given mandibular movement or range of occlusion. If the published works of the leading orthodontists are a criterion of the orthdontist's point of view, we are justified in assuming that central

1. Monson, G. S.: Occlusion as Applied to Crown and Bridgework, J.A.D.A., 7: 399 (May) 1920.

2. Washburn, H. B.: History and Evolution of the Study of Occlusion, Dent. Cosmos, 67: 223 (March) 1925.

occlusion only is the goal of the orthodontist's efforts.[3]

The periodontist, the latest entry in this field of investigation, has not been satisfied with observing occlusion in central occlusion only, but is more interested in what occurs during mandibular movement or range of occlusion.

We can easily determine the reasons for such a situation. The prosthodontist, by the nature of his work of replacing great losses of teeth, was compelled to use an instrument outside the mouth to build the case. As the demand for this service became more exacting, it was necessary to construct articulators that would more nearly reproduce jaw movements. A half century devoted to this phase alone was bound to result in a one-sided observation, that of jaw movement independent of natural teeth.

The orthodontist's point of view again was a natural one in that it began with a desire to straighten teeth and bring them into some sort of esthetic relationship. This task alone required so much ingenuity and patience that, if a result at all acceptable in central occlusion was obtained, patient and operator alike were ready to call the case finished.

The periodontist[4] began to focus his attention on occlusal contacts because all his efforts in scaling and polishing teeth were not producing the cure for pyorrhea alveolaris that was so much desired. Consequently, the underlying cause of this disease was searched for, and, among a large number of periodontists, it became apparent that traumatic injury caused by incorrect tooth contacts in occlusion was responsible for the first injury. Here, we find more nearly a combination of the work done by the prosthodonist concerning mandibular movements, and the orthodontist concerning teeth as units.

The question may be raised as to the reason for calling attention at length to what has been done in the field of this discussion. Let us briefly consider the many so-called specialties in dentistry. We must admit that if an individual observes in his makeup a decided leaning to and aptness for some particular phase of dentistry, he, no doubt, can serve best by devoting all his energy and thought to this one field. Notwithstanding this fact, it is becoming more and more apparent that no specialty in dentistry can stand by itself. We are all working for the same end, that of conserving the masticating apparatus for the best health interest of the patient. The thought I most desire to emphasize here is that the history of dentistry, obtainable from reading the published work of investigators in all its fields, indicates that occlusion, in the broadest meaning of the term, is the one connecting link between all specialties and all branches of dentistry. Therefore, regardless of our particular choice of work in dentistry, we must be familiar with what men are doing in all other fields of our profession.

There is a tendency among dentists to let the researcher work as hard as he likes but to fail to give sincere study to what is published concerning these investigations. It is a deplorable situation

3. Case, C. S.: Technics and Principles of Dental Orthopedia, Chicago, C. S. Case Co. Angle, E. H.: Treatment of Malocclusion of the Teeth, Philadelphia, S. S. White Dental Mfg. Co. Dewey, Martin: Practical Orthodontia, St. Louis, C. V. Mosby Co.

4. Stillman, P. R.: Traumatic Occlusion, J.N.D.A., 6: 691 (Aug.) 1919. Quinby, E. M.: Nutrition and Occlusion in Periodontoclasia, J.A.D.A., 11: 1197 (Dec.) 1924. Bricker, F. A.: Diagnosis and Correction of Traumatic Occlusion, J.A.D.A., 11: 697 (Aug.) 1924. Hirschfeld, Isador: Mechanics of Mastication in Relation to the Health of the Periodontium, J.A.D.A., 9: 120 (Feb.) 1922.

that principally because of this lack of real interest, men are unable to discriminate adequately and are apt to be led by some superficial reasoning to adopt a particular method without knowing its true value.

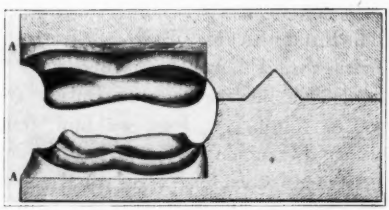

Fig. 1.—The original articulator.

The evidence of a superficial understanding of the many dental problems is manifest by the statement of so many dentists that they are not interested in theories and principles—what they want is a method for doing a certain thing. Which would you prefer, a mechanic who knew only how to handle a screw driver and a monkey wrench and who had been told how to fix certain things on an automobile, but who knew nothing about the underlying principles of automobile construction, or a mechanic who knew automobile construction from the ground up? Let us put this question to ourselves as dentists: Are we thoroughly grounded in the fundamentals and principles of our work or have we become mere handlers of tools, able to grind teeth, make castings, etc.?

The study of occlusion becomes more perplexing the deeper one goes into it. The various theories advanced have in the main been of an abstract type. There is a feeling that there is nothing definite to tie to. Let us turn back to the day when little was known of mandibular movement and dentists used an articulator made of plaster. (Fig. 1.)

There is no movement possible here except straight up and down in a vertical plane. If such was the natural movement of the mandible during mastication, the tooth arrangement illustrated in Figure 2, left, would be as efficient as that shown on the right.

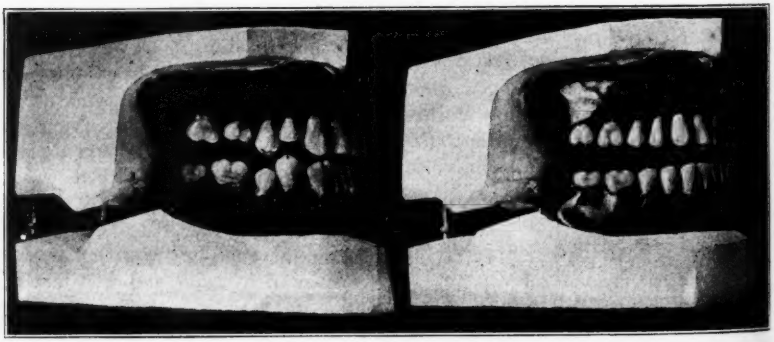

Fig. 2.—Left, irregular setup; right, regular setup.

It is obvious that the dentists of that period were primarily and only interested in setting up teeth in one position, that of central occlusion. If we could leave this statement and these illustrations as a thing of the past, our problem would be much simplified. The lamen-

table fact is that too many dentists today think of occlusion in these same terms, that is, they apparently know little and care less about what occurs in tooth occlusion during movement.

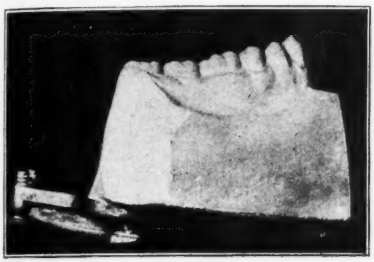

Fig. 3—Line of occlusion.

Since the time when this primitive articulator was the only one in use, there have been many sincere efforts made to produce something better or more nearly like the masticating mechanism. Among the investigators we have Dr. Monson, and it is his work and his conception of human occlusion that I shall endeavor to interpret.

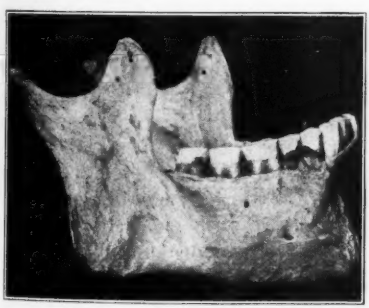

Fig. 4.—Line of occlusion and condyles.

Dr. Monson conceives the highest type of human occlusion to be so arranged that the occlusal surfaces of the bicuspids and molars, the incisal edges of the anterior teeth and the condyle conform to the surface of a sphere; and that, during movement of the mandible in this ideal case, the teeth and the condyles would move on the surface of a sphere. While this concept is now pretty well accepted, there are still many men who cannot agree with Dr. Monson's idea, and there are good reasons why some have not accepted the spherical principle. One is that men have not learned to observe certain things about the human dental apparatus. Another is a lack of thorough understanding of what Dr. Monson is teaching.

Combining observation of dental arches with Monson's principles of occlusion, let us consider Figure 3. Here we have illustrated the line of occlusion or the line to which the incisal edges of the anterior teeth and the buccal cusps of the posterior teeth conform. Figure 4 illustrates the same thought applied to the teeth and the condyle; Figure 5, a segment of gear relationship.

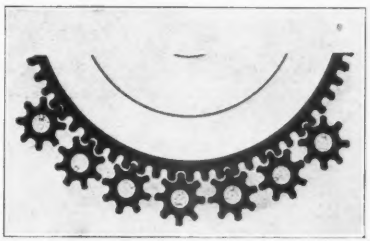

Fig. 5.—Segment of a gear relationship.

These three illustrations call attention to the need for observing certain things. The line of occlusion extending back to the condyle is similar to the one shown in the gear relationship. In other words, what we see is an arc or the segment of a circle. This arc line presupposes a center, which is shown in Figures 6 and 7.

So far, we have illustrated the conformation of occlusion and condyle to

the arc of a circle only. This was Spee's conception, in 1890, the anteroposterior line. If we left the problem

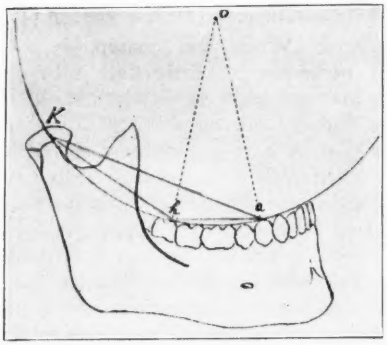

Fig. 6.—Line of occlusion in relation to a center.

here, we should only have a conception of an anteroposterior movement of the mandible.

Monson's observations went farther

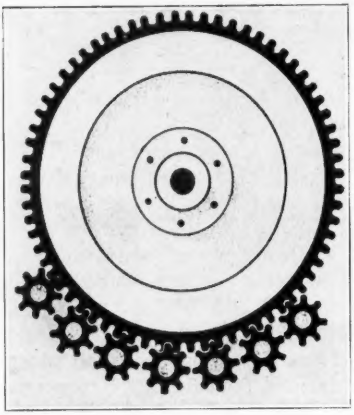

Fig. 7.—Enlargement of Figure 5, to show presence of center.

and developed in his mind the combination of movement on an arc, anteroposterior with transverse or lateral movement. This is not a difficult observation to make; for the nearer we come to an ideal type, the easier it is to visualize not only the occlusion and condyles as conforming to the surface of a sphere in a central occlusion position, but also the fact that the movement of the mandible is on the surface of the sphere.

To convince one's self of this fact, it is suggested that each day, in practice, attention be paid to the types presented by patients, searching for as nearly a perfect type as it is possible to find at the present time. When a type is observed that seems quite perfect, impres-

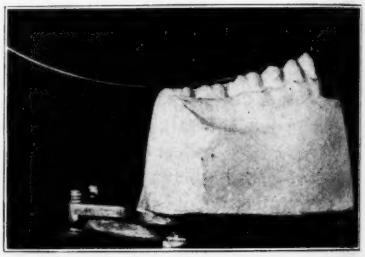

Fig. 8.—Segment of 8-inch circle on lower occlusion.

sions should be taken and casts made. Place the segment of an 8 inch circle anteroposteriorly on the lower cast as in Figure 8. If the case is nearly perfect, the buccal cusps will conform to the arc of the circle. Then, with the segment of an 8 inch sphere placed on the same cast, the logic of the spherical conformation will become evident, as contact of both lingual and buccal cusps to the arc will be observed. In other words, this is equivalent to placing one circle anteroposteriorly and one circle transversely.

After this test has been made on casts outside the mouth, have the patient produce forward and lateral movements. It will be found that tooth contact of all the teeth will be maintained in all the

masticating ranges, laterally and forward; that is, the farther removed the occlusion is from conforming to an arc plate, the fewer the number of teeth in contact in any position after leaving central occlusion. As the power of observation is developed, it will become more and more apparent why we are having so much difficulty in understanding occlusion.

In order to make practical application of these observations, it was necessary for Dr. Monson to construct an instrument that would reproduce natural tooth

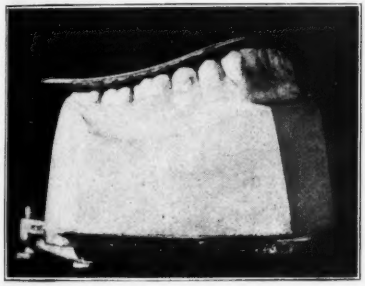

Fig. 9.—Segment of 8-inch sphere on lower occlusion.

contact during mandibular movement regardless of the type of occlusion. Dr. Monson selected as his standard a perfect human masticating mechanism. Such a type would conform to the surface of an 8 inch sphere; therefore, his instrument is constructed on that basis. But there are certain adjustments on the instrument that permit the mounting of any type of occlusion that we may come in contact with even though it varies greatly from the ideal.

Now, how can we use such an instrument to assist us in our everyday work? Regardless of the type of dentistry required, we should have a means whereby we can answer these questions: 1. Is the case one of ideal occlusion? 2. Does the case vary from the ideal? 3. If the case is not ideal, will that fact influence the operation needed? 4. Will the fact that the case is not ideal influence the life of the whole masticating apparatus?

For the purpose of logical thought, let us go back to the illustration of the gears, in this case assuming that a certain section of the periphery of the large gear had been broken out. Whatever caused the change is this periphery from

Fig. 10.—Monson articulator with casts of natural teeth.

the perfect one that it once was did not injure the center about which the periphery moves. Therefore, the machinist can caliper from this center and re-establish the periphery, which would then be as good as it was before the break.

Using this same line of reasoning in dentistry, we should first become familiar with the ideal or perfect in occlusion, and when any case is mounted on the Monson instrument the idea of relationship of occlusion to the center is paramount. When correctly mounted, which means that in the cast there is the same relationship of occlusion to the center that is present in the patient, we

have a means by which we can determine what deformity has occurred in the occlusion.

By using the machinist's method of calipering from the center to the occlusion, we can first determine what segments are out of line and what must be done to correct the whole line of occlusion. This is of equal importance in orthodontia, periodontia, crown and bridgework, full denture construction, partial denture construction and operative work. Because the subject of Dr. Monson's research is of value to the whole field of dentistry, I am making this effort to call attention to a few of the essentials of his work.

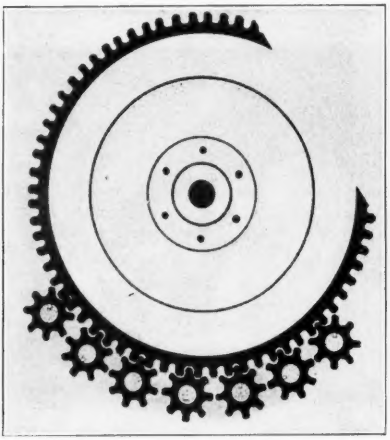

Fig. 11.—Gear with segment broken out.

In 1919, five men grouped themselves with Dr. Monson and formed the Monson Research and Clinic Club. The purpose of this group was, and still is, to search diligently for the truth concerning occlusion and mandibular movement. This work to be of value must be scientific, and as we are not trained in science we have enlisted men of science in the University of Minnesota and others, who are aiding us by checking our plans as we proceed. Today, our small group has grown to a larger local group, and there are groups and individuals interested in all parts of the country. There is a great deal of value in having sincerely interested men, at home and away, working on these problems, for we thus get a broader field of observation.

Obviously, there are many phases for such research. Varying intervals of time must elapse before we can arrive at conclusions that, stated as scientific facts, will be accepted by scientific men. Neither Dr. Monson nor the Monson Club desires to make public any observation without first being certain of its soundness, truth and accuracy.

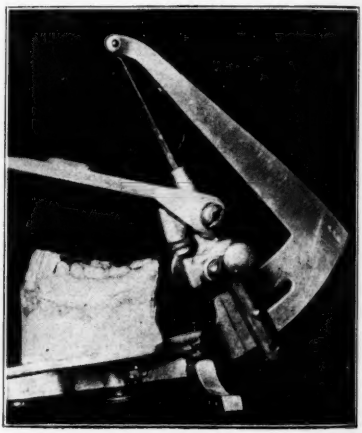

Fig. 12.—Lower cast of natural teeth, with arc of correct occlusion calipered from center on articulator.

Three points we would like to present at this time are: 1. The need of a standard or norm. 2. Our conception of balanced occlusion in natural teeth. 3. Our conception of an extreme overbite in natural teeth as being a deformity

or malocclusion. We will now discuss the first point, the need of a standard or norm.

As dentists, we are called on to make decisions that require knowledge of certain standards from which comparison is made. In this respect, dentistry must have standards such as we find in medicine, law, theology and engineering.

Medicine and surgery demand a knowledge of the healthy, perfectly formed body, as the standard by which unhealthy, deformed bodies are recognized. Law has well established statutes and precedents to which reference is made when the conduct of any individual or group of individuals is in question. Theology is based upon certain fundamentals that precisely determine between what is right and what is wrong concerning human conduct and human relationships. Engineering, through a correlation of the knowledge gained of all fundamentals or natural laws pertaining to building materials of all kinds, is able to determine the difference between the ideal and any variation therefrom.

Artisans also have standards by which they measure and perform their tasks; as a concrete example, the level, the plumb line and the square. We could go on *ad infinitum* with examples illustrating the need, in every branch of professional endeavor and skilled labor, of standards by which to operate.

What is the standard or norm in human occlusion by which dental operators may judge when diagnosis is attempted of the cases presented in everyday practice?

Manifestly, such a standard or norm cannot be man-made except in the sense of interpretation through observation. Observation must not be confined to the surfaces of a few teeth or even to the relationship of a few teeth. A norm or standard of occlusion to be of value in our work must consider teeth, jaws, throat, nose, ears, individually; then the relationship of all in physiologic function. Black[5] and Angle[3] have quite thoroughly laid out the study of the teeth and certain relationships in central occlusion. Wright[6] and Monson[7] have given us the results of their observations concerning the relationships of the whole mechanism.

As a matter of fact, a conception of human occlusion, acceptable as a norm or standard, must be one of ideal or perfect condition. It is almost impossible to find such an ideal relationship of all factors that combine in the full meaning of the term occlusion. But if we can conceive this ideal or perfect condition, we are assisted materially in two ways: First, our powers of observation are developed through constantly searching for the ideal in our everyday practice. Second, a conception of the ideal becomes a standard for diagnosing the degree the occlusion we see in everyday practice fails to measure up to our requirements. It naturally follows that plans for correction are suggested by comparison of the case as presented, with our conception of an ideal.

Do you see any logic in possessing an ideal standard or norm by which necessary corrections of human occlusion are planned? Is it not true that the more comprehensive the standard of measurement, the better the plans for correction

5. Black, G. V.: Descriptive Anatomy of the Human Teeth, S. S. White Dental Mfg. Co.

6. Wright, W. H.: Deafness as Influenced by Malposition of the Jaws, J.N.D.A., 7: 979 (Dec.) 1920.

7. Monson, G. S.: Impaired Function as a Result of Closed Bite, J.N.D.A., 8: 833 (Oct.) 1921.

will be? Would you expect a surgeon to recognize a deformity in the human body without first having a full understanding of the body in perfect health?

Dr. Monson's conception of the development of an ideal occlusion may be briefly stated as follows: A normal child at birth, developing normally thereafter through correct diet, correct exercises and freedom from illness, should come to maturity with all the teeth present and in correct relationship. We know the teeth in occlusion determine the relationship between mandible and maxilla. Such a condition, in turn, allows correct adjustment of all soft structures of face, throat, neck and tongue, and thereby promotes normal function of the mouth and all associated parts.

Fig. 13.—Left, central occlusion; center, right lateral occlusion; right, left lateral occlusion.

There should follow balanced occlusion, which is point Number 2, and is defined as follows: "That type of relationship between the mandible and maxilla (the relationship being maintained through the teeth) which permits a maximum continuous contact of upper and lower occluding surfaces, through all ranges, from central occlusion to lateral and incisal, and back to central."

Figure 13, left, illustrates a case of ideal, balanced occlusion in the central occlusion position; center, same case in right lateral occlusion. To be balanced according to our conception of balanced occlusion, there must be equal occlusal contact on the side which we cannot see as on this exposed side. Figure 13, right, illustrates the same case in left lateral occlusion.

The Monson Club, as a result of work done with Dr. Monson, offers this as a true conception of balanced occlusion. With such a relationship, the patient can move from any one position to another, keeping the teeth in contact. There will be no obstruction to this movement; there will be a maximum contact at all times, and there will be no excess stress or strain on any one tooth or segment of the arc.

As we stated, such types of cases are very rare; but dentists should have a conception of such a type and be ever on the lookout for it. If such a case is found and correctly mounted on the articulator, it serves as a reference and a source of study when the more common type of mutilated arch and deformed relationship is met.

The periodontist is recognizing the lack of this ideal balanced occlusion. He knows that whenever this lack of complete balance creeps in, there will be periodontal trouble. The orthodontist

is learning that he must not be satisfied with a beautiful tooth relationship in central occlusion only; for if there is not this ideal balanced occlusion during the movement of mastication, there will result sufficient change in the tooth positions to cause a failure for him in his work. The prosthodontist, whether his work is removable or fixed, is beginning to recognize that something more than good impressions and good technic of construction are necessary in his field. As the lack of balance creeps in, in his case after being mounted on the instrument was checked by the checkbite method, which assures us of the relationship in these various positions being the same as in the patient's mouth.

In order to appreciate what this type of case means, we must be familiar with what constitutes right and left lateral movements. We know that in central occlusion the condyles are in the upper posterior part of the glenoid fossa. If the mandible moves directly and only from side to side without any forward

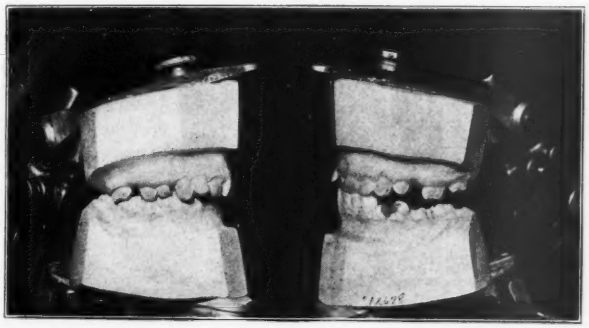

Fig. 14.—Unbalanced occlusion.

work, there will result failure of the reconstruction. Even the man who confines his efforts to purely operative procedure must know what balanced occlusion is, must know the ideal type, in order to render the best service in advising his patient as to what shall be done.

While it is true that this ideal type is a rare thing, it is also true that we can very nearly approach this ideal balanced occlusion in our reconstruction cases.

There are many types of variation from the ideal. For the purpose of showing a decided contrast between balanced occlusion and a mutilated and deformed occlusion, I have selected an extreme overbite case. (Fig. 14.) This movement, then one condyle must necessarily go backward a distance equal to the distance the opposite condyle goes forward. Obviously, such a situation is impossible, as both condyles start from the posterior part of the fossa.

What we know actually does take place in lateral movement is that the condyle on the working side remains in the upper posterior part of the fossa and the opposite condyle travels forward and downward on the anterior inclined plane of the glenoid fossa. This automatically introduces the forward movement of the mandible as a part of the lateral movement.

Referring again to Figure 14, two

things become apparent: 1. An extreme overbite must of necessity restrict true lateral movement as well as straight forward movement; for such movements immediately cause contact of the upper and lower anterior teeth with no support by the posterior teeth. This is overcome in some cases by the patient's learning to go to forward or lateral positions with the mouth open, then, with the bolus of food properly placed, slide back to central occlusion. However, your attention is called to the greater stress produced against the anterior teeth in this type of case. Other patients with this type of occlusion do not learn to reach forward and lateral positions with the jaws open and, owing to the obstruction, confine their masticating movements to open and closed.

2. Owing to the obstruction offered to true forward and lateral movements by this extreme overbite, we may have as a result a breaking down of the process around the upper anteriors and a coincident tipping forward of the teeth; a breaking down of the process around the lower anterior teeth and a tipping backward of the teeth; or a crowding back of the mandible, which may produce a change in the mandible at the angles in condyles or in the glenoid fossa. We may have a combination of all of these results in the same case.

Frequently, it will be observed that there is an attempt made by Nature to compensate in a small degree for this overbite. This takes the form of that type of occlusal line in the region of the last molars to allow contact of the last molars in forward and lateral positions.

Such compensation is held by some observers to constitute balanced occlusion, but the Monson Club findings stamp such a balance as a makeshift and not a true balance. In addition, our observations reveal Nature's plan in bringing about this compensating balance. To the best of our knowledge to date, in bringing about this condition the angle of the jaw is altered, and the condyle relationship in the fossa is also altered.

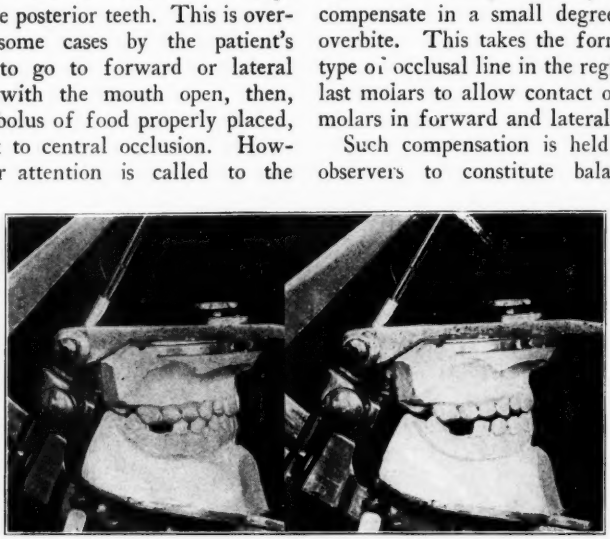

Fig. 15.—A three point contact type of unbalance.

There is a sharp difference of opinion among dentists today concerning the procedure for a restoration; by which is meant bridges, or entire occlusal surface restoration, partial dentures and full dentures. This difference of opinion deals with the problem of jaw relationship and the influence of jaw re-

lationship on the surrounding structures. Among thinking dentists, regardless of the branch of dentistry practiced, this difference of opinion has resulted in two distinct groups. The one group is of the opinion that there is the possibility of jaw deformities and mutilated occlusion accompanied by changes in muscles, nerve and blood supply and general interference with physiologic function of the masticating apparatus and associated structures—that such conditions develop as a result of occlusal relationship, possibly beginning in childhood or later by extreme wear on cusps, loss of teeth, etc. This group of thinking dentists believes such conditions should be recognized, the earlier the better, and some effort should be made to correct or to restore as nearly as possible to some previous and more favorable condition.

Dr. Monson[7] and Dr. Wright[6] have called attention to some of the physiologic impairments resulting from incorrect jaw relationship. The Monson Research and Clinic Club is devoting a large part of the time spent in research on this problem. To date, the findings are overwhelmingly in favor of the opinion that deformities do exist and that such deformities can be in a large measure corrected. Further, we desire to say at this time that such corrections have produced better oral and better general health; and what is so important to all, have insured longer life to the dental restoration. The observations on which these opinions are based cover a period of seven years.

The other group of dentists hold the opinion that possibly deformities do occur, but, if so, Nature is in some way compensating for the condition. Therefore, they pay practically no attention to such conditions, and build restorations to meet the condition and thus maintain it as found.

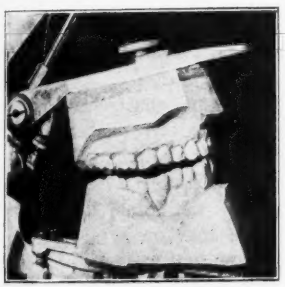

Fig. 16.—Overbite case in forward occlusion.

Fig. 17.—Same as Figure 16, after reconstruction.

If we as dentists had a comprehensive standard or norm and know the danger ahead for the patient when occlusal relationship fails to measure up to the standard, there would be less excuse for persisting in ignoring the mutilated or deformed types that come to us in everyday practice.

REPORT OF ILLUSTRATIVE CASE

Miss S., aged 35, made regular visits to her dentist and was therefore confident that she was taking good care of her teeth. Early in life, before she was of an age to appreciate good teeth, the lower first molars and upper left second

bicuspid were extracted. Before bridges were placed, several retrograde consequences became evident. Because the mandible did not develop normally she appeared to be chinless and there was an insufficient occlusal contact. The upper first molars were elongated from lack of contact in the lower jaw. The vertical development of mandible and maxillae apparently was arrested. The mandible seemed in a posterior position, causing throat trouble and general discomfort. When bridges were placed, they were made to fill the space, maintaining the mutilated occlusion and deformed relationship of mandible to maxillae. There were beautiful inlays, well constructed bridges, but there was no observance of the conditions in relation to a norm or standard.

For some time, the patient was happy in the thought that her mouth was in good condition. Then, gradually, she became conscious that all was not well. She became irritable and finally very ill, being principally neurasthenic, with pains in the head, etc. She finally decided that the trouble could be traced to a generally uncomfortable feeling about the jaws.

I wish to emphasize the point that this patient diagnosed her own case. She decided that there would be relief from pain if the bite were opened. Figure 17 shows the case completed. After three months, the patient was free from pain and all discomfort; periodontal conditions were improved, and she was quite happy. The difference in face contour and face expression was marked.

Beautiful word pictures of occlusion have been presented in papers and textbooks, setting forth the great number of inclined planes on the occlusal surfaces of upper and lower teeth. Illustrations of the best examples of such described tooth arrangement are given to substantiate the text. Description and illustrations are of a static condition; nevertheless, the thought is clearly presented that such tooth arrangement as illustrated is necessary for the highest masticating efficiency. But where can we find a text which accurately and satisfactorily describes what occurs when the mandible moves as in mastication?

The task of constructing occlusion whether operative, prosthetic or orthodontic, to a normal relationship in central position, is not such a difficult one. But what is the comprehension of this machine in movement?

The greatest task before dentistry today is to search for and learn the principles underlying occlusion and mandibular movement. It is not the part of this paper to present a solution of the problem. However, enough interest in the subject is manifest so that the presentation of this phase of the subject may be an added inducement for more accurate observations in our everyday practice. As an aid, let us search for and find the highest types of development and use these as the norm by which to make diagnosis and correction.

THE PULPLESS TOOTH PROBLEM

By ARTHUR B. CRANE, D.D.S., Washington, D. C.

(Read before the Chicago Dental Society, September 15, 1925)

IN THE quest for a solution to the problem of the pulpless tooth, there has been some tendency to assume that the tooth and its supporting structures are subject to erratic influences entirely unconformable to normal biologic laws. While the tooth is a highly specialized organ, its health is dependent on natural processes and reactions common to all tissue.

The justification of any therapeutic agency is its compatability with normal tissue conditions and inherent tissue reactions. Root canal treatment can be successful only when this qualification is observed.

There are certain features of the normal anatomy of the tooth and its supporting structures on the existence of which the feasibility of root canal work depends.

Of prime importance is the histologic character of the dentocemental junction. A microscopic study of this area will disclose an extremely thin band of homogeneous dentin completely surrounding the periphery of the radicular dentin. Adjacent to this inorganic layer of dentin, and in such close contact with it as to make differentiation difficult, is a similar band of amorphous material lining the cementum. The effect of this double layer of solid material is to wall off or insulate the dentin, so that the passage of bacteria is absolutely impossible except through the apical foramina or abnormal communications.

While the dentin is devoid of regenerative capacity, the cementum is a constantly growing tissue. The embedded fibers of the pericementum are often cut off from areas of the cementum by physiologic absorption due to the normal stress of occlusion. When this occurs, a new layer of cementum is formed, embedding other fibers of the pericementum. This reparative process is the function of the cementoblasts which lie between the fibers of the pericementum. As long as the vitality of these cells is unimpaired, there will be a spontaneous formation of cementum in response to natural requirements.

The normal extremity of a root canal consists of a crater-like or funnel-shaped depression in the apical cementum. Grove[1] has demonstrated that this depression is filled by a dipping in of the fibers of the pericementum. If this tissue remains vital, even though the pulp is destroyed, this part of the canal may be closed, through the normal activity

1. Grove, C. J.: Root Canal Operations, J.A.D.A., 12: 1074 (Sept.) 1925; A Consideration of Pathogenic and Nonpathogenic Pulpless Teeth, J.N.D.A., 7: 763 (Sept.) 1920.

of the cementoblasts, in such a manner as completely to shut off the canal from communication with the vital tissues. Thus, Nature is capable of the completion of the inorganic barrier, which constitutes an efficient defense against infection from the substance of the dentin or the pulp channels.

Since the normal anatomy and reactions of the tissues are so favorable to root canal therapy, it is helpful to study the inherent protective manifestations by which Nature indicates that pulpless teeth are not necessarily abhorrent.

Great emphasis has been laid on the fact that, when a tooth has lost its pulp, the dentin of such a tooth is dead. From this fact, we have the misleading term "dead tooth." It has not been so generally recognized, however, that whole sections of the dentin are often devitalized by the natural protective processes of the living pulp. Thus, when the security of the pulp is threatened by exposure of the dentin, through abrasion, erosion or caries, the immediate reaction is the formation of a layer of secondary or adventitious dentin between the pulp and the exposed surface. The effect of the interposition of this defense wall is to cut off the proximal fibrils from communication with the pulp, thus destroying the vitality of the adjacent dentin. This process is unrestricted, and may continue until the entire pulp has been obliterated by the formation of adventitious tissue. This is Nature's method of root canal filling, and its significance is increased by the fact that such teeth are not subject to periapical disease. It proves that dead dentin is not necessarily obnoxious to the organism. It definitely establishes the value of any method of root-canal treatment which produces similar results.

The question of the retention or extraction of pulpless teeth cannot be scientifically decided in the aggregate. It is a question of diagnosis in each individual case. If conditions are favorable to apical repair, or if such repair has already occurred, extraction is an unwarranted mutilation. This sounds definite; but the difficulty lies in the fact that our present methods of diagnosis are so deficient that such conditions cannot always be fully determined.

It is generally conceded that the death of the pulp caused or accompanied by an invasion of pathogenic bacteria is the forerunner of periapical disease. As long as the periapical tissues remain normal, the natural tissue resistance is competent to prevent the spread of a few micro-organisms from the substance of the dentin. But once the bacteria are able to gain a foothold in the tissues, there is an infective reaction. The pericementum becomes thickened, the lamina dura disintegrates and a pathogenic focus is established.

While the first line of defense is thus broken, the invasion does not go unchecked; for, with the aid of the leukocytes and fibroblasts, a limiting wall is formed about the infective process and a Class I, or circumscribed, granuloma is produced.

According to Hatton,[2] such granulomas are formed in a crypt between the apical fibers of the pericementum and so the apical cementum is not immediately denuded.

If, at this stage, the ingress of bacteria is checked by proper treatment, resorption and resolution may follow. Unfortunately, because of neglect or

2. Hatton, E. H.: Histopathology of the Periapical Region, J.A.D.A., 12: 49 (Jan.) 1925.

faulty treatment, the reverse is often the case: the granulation tissue breaks down, the limiting wall is ruptured and a diffuse, or Class II, granuloma is produced; or it may happen that coagulation, and liquefaction of the granulation tissue will occur, and an acute abscess be thus induced.

In frequent instances, the apical pericementum contains epithelial remnants. These may form strands about developing necrotic areas, thus converting the granuloma into a cyst. Wherever this occurs, there is no longer rarefaction of the alveolar bone, but a shell of dense bone is formed about the advancing tumor.

The foregoing pathologic conditions, when definitely established, are generally capable of interpretation. However, there are many transitional changes of the utmost importance which cannot be recognized by existing diagnostic procedures. If it were possible to determine just when the apical fibers of the pericementum have begun to disintegrate; or when the apical cementum has become denuded; or when a circumscribed granuloma is changing into an abscess or a diffuse granuloma; or when a cyst is in process of formation, prognosis would become infinitely more reliable.

Of all diagnostic means in present use, the dentists and physicians depend mostly upon the radiogram for the detection of periapical disease. The complete definition in the film of the apical pericementum and lamina dura is widely accepted as an indication of the periapical norm, but the limitations of dental radiography often make such definition impossible. Perfectly normal teeth will sometimes appear to be lacking in apical lamina dura; and, in the upper bicuspid and molar regions, the superimposition of other structures frequently makes reading uncertain.

In perusing current literature, one frequently observes the term "radiographically negative." This term is more or less ambiguous, its exact meaning depending on the individual conception of what constitutes disease. The substitution of the term "radiographically normal" would result in a more definite standard and would doubtless reduce to a minimum the percentage of so called "radiographically negative" teeth which produce growth from apical cultures.

By retouching dental radiograms in such manner that all evidence of the pulp canal is obscured, it may be clearly demonstrated that many pulpless teeth have periapical areas apparently more nearly normal than adjacent vital teeth. Disease is manifested by structural or functional changes. In the absence of any local pathologic reaction sufficient to be detected in the radiogram, pulpless teeth should be tested by other available clinical means. Important among these is the transillumination test. A chronic inflammation of the apical pericementum will cast a shadow. Not every infectious process will cast a shadow, but when a shadow *is* cast, it is diagnostic of infection.

Thermal extremes, induced by making applications of ice to the crown of the tooth and following immediately with a continuous blast of hot air, will sometimes produce pain. This is an indication that the apical orifice is not closed and that an infective process is impending.

The exhibition of tenderness on percussion or sudden occlusion or a report of occasional fleeting pains or soreness also suggests incidental infection.

When the pulpless tooth is radiographically normal and the clinical tests are negative, it is contrary to all accepted principles of diagnosis to pronounce such a tooth a pathologic focus. To do so is to be influenced by fear, rather than by scientific probabilities.

Much valuable, though at times misleading, research dealing with pulpless teeth is being carried forward by certain eminent pathologists. It would be absurd for one who is not a pathologist to question their technic, but one may comment on their conclusions when they are at variance with clinical observation. A perusal of medical literature leads to the belief that the spectacular results of some cannot be verified by the findings of others. It is obvious that some of these workers do not bother to acquaint themselves with ordinary dental procedure and have but slight conception of the normal histology of the teeth. The placid way in which they group all pulpless and crowned teeth into one pernicious class indicates their unconcern as to the dental point of view.

Bacteriologic findings from the apices of many pulpless teeth may explain the condemnation of them all, but Haden's report[3] of 54 per cent of vital teeth which when cultured gave growths similar in kind, if not always in the number of colonies, leads logically to the assumption that the only safe course would be the extraction of all teeth.

The work of Rosenow[4] and others of his group on elective localization is a strong argument against the retention of infected teeth; but it does not prove that all pulpless teeth are infected nor that certain infections sequent to the death of the pulp cannot be controlled by methods other than extraction.

The obvious implication that root canal therapy is always a failure is refuted by microscopic study. Grove[1] has demonstrated the absence of all evidence of infection in the apical tissues of many pulpless teeth which he has sectioned, and similar studies by Hatton[5] indicate that certain teeth with demonstrable periapical lesions may return to normal after treatment and filling of the root canal.

No intelligent clinician underestimates the potential danger of infected teeth, but research and clinical experience bear witness to the frequent possibility of nullifying this danger by conservative treatment.

A careful consideration of much of the literature on the management of pulpless teeth, supplemented by a long clinical observation and practice, has led me to the following conclusions.

CONCLUSIONS

1. The chance of rendering a pulpless tooth innocuous is directly proportional to the extent to which tissue destruction has occurred. Thus, the most favorable cases are those in which the vital pulp is aseptically extirpated and the root canal immediately filled. As the pulp undergoes decomposition, the chances decrease; and when periapical disease is established, treatment becomes an entirely tentative procedure. As long as the limiting defense wall is unbroken, there is some hope of success; but when the defense wall is broken or

3. Haden, R. L.: Radiographic Diagnosis of Periapical Dental Infection, Dent. Cosmos 67: 380 (April) 1925.

4. Rosenow, E. C., and Meisser, J. G.: Elective Localization of Bacteria, J. Lab. & Clin. Med. 7: 707 (Sept.) 1922.

5. Hatton, E. H.: Quoted by Black, A. D.: Disc. J.A.M.A., Vol. 65, 1915.

cystic degeneration takes place, treatment through the canal is practically useless.

2. The use of irritating or tissue destroying drugs, or instrumentation beyond the dentocemental junction, invites failure. Attention has already been called to the necessity for preserving the vitality of the apical tissues. By baneful medication or overenthusiastic instrumentation, the very elements which alone can produce a cure are hopelessly destroyed.

3. In the event of an excessive acute inflammatory reaction during treatment, free drainage should be immediately established.

A small window cut through the alveolar plate will relieve the tension caused by the inflammatory exudate, and if the infectious process within the root is under control, healing will rapidly ensue.

4. The incorporation of a mild, slowly dissolving antiseptic in the root canal filling material is potentially beneficial. The loud cry for asepsis as against antisepsis, and the reiteration of the axiom that there is no such thing as a permanent antiseptic, have caused many to abandon this old time procedure. With the infection in the dentin under control as the result of treatment, the antiseptic filling will act as a prophylactic until Nature has had an opportunity to wall off the apical foramina.

5. The extent of the root canal filling is of relatively little importance, but protrusion beyond the root end can serve no good purpose. As a matter of fact, many teeth with obviously imperfect canal fillings are in as good or better condition from a radiographic standpoint than any which show the least protrusion. As it is impossible to have union between living tissue and a foreign body, there will always remain about such protrusions a defective area, often demonstrable in the radiogram. This does not necessarily mean that disease persists, but it makes questionable a clean bill of health.

The tooth root contains anastomosing channels left in the dentin for the accommodation of the pulp and its blood vessels. While every effort should be made to fill the canal as thoroughly as possible, perfect obliteration of these channels by artificial means is an ideal which is impossible of realization *in situ*.

In considering the many failures which have followed root canal treatment, it is consoling to remember that there is no surgical operation or treatment which is infallible. Even the most radical surgical removal of infected teeth will sometimes leave a residual focus. Results are more convincing than controversy, and when preconceived ideas do not obscure the judgment, the results obtained through the conscientious treatment of pulpless teeth will measure well up in the category of successful therapeutics.

It is to be regretted that many dentists quickly abandon established practices as soon as there is adverse criticism from medical sources. While dentistry fully appreciates the value of collateral medical research, the scientific attitude is to weigh the claims for new theories in the balance with the results of the old practices. There are many theories, capable of laboratory demonstration, that call for extensive clinical application before they can be accepted as proven.

In the disposition of pulpless teeth, the dental profession must not bow in weak submission to the dictates of medical men, no matter how prominent. All

evidence, from whatever source, must be considered with an open mind, with the sole purpose of arriving at the truth. Only thus can the dentist of today sustain the scientific heritage of the profession.

DISCUSSION

Thomas L. Gilmer, Chicago: It is a pleasure to respond to a paper which is not overly dogmatic. We are inclined at present to be overly dogmatic on this subject. We have known for a number of years that infected pulpless teeth are in some instances harmful to the physical well-being of mankind. Hunter of England made a stir when he told us of the dangers from oral infection and cited certain phases of American dental practice as among its most prolific causes. Soon afterward, Billings and others definitely fixed the relationship between oral infections and certain diseases. It has long been known that some acute infections, whether of the jaws or of some other region, caused an albuminuria and other secondary manifestations. A study of the bacteriology of both acute and chronic infections was undertaken with the discovery that, in acute abscesses about the apices of the teeth, the prevailing organism was the hemolytic streptococcus, and that the prevailing germ of chronic apical infection was *Streptococcus viridans;* also, that in certain infections in the third molar region which took on the characteristics of a cellulitis, there were detected the streptococcus and *Bacillus fusiformis*, which seemed to be growing in symbiosis. Rosenow's extensive research revealed that, in certain heart lesions, the streptococci were the cause of the disease, and he was able, by inoculation, to produce similar diseases in animals. Two groups of dentists now arrayed themselves in opposition to each other. One was the ultraconservative group, which did not accept the theory that apical infections caused secondary diseases; the other, the radical group, which contended that all pulpless teeth were a menace to the health of man. A third group accepted the statement that apical infections were a cause of secondary disease, but did not accept the declaration of the second group that, because a tooth is pulpless, it must of necessity be a menace to health. I have always found myself in accord with the third group. I believe I have been a conscientious student of the subject, and I have had good and wise aid in this study. Physicians have referred many patients to me to determine the condition of the teeth and jaws. I have learned from these physicians the nature of the ailments of the patients and recorded this information, noting on diagrams the condition of the mouth, teeth and jaws as indicated by radiograms and ocular examination. I have several thousand of these histories. It has been my good fortune to have been able to follow up many of these patients and to observe their condition at various times subsequently. In some instances, when chronic jaw infection has been discovered there has been marked improvement in the patient's condition after eradication of the infection. In some instances, radical cures have followed; in others, none at all. When there has been radical improvement, it is reasonable to suppose that the jaw infection was the principal cause of the secondary disease. In other instances, in which there has been improvement but not a complete cure after removal of jaw infection, I have concluded that there were, in such cases, foci in other parts of the body which had been overlooked and that, by eliminating the jaw infections, the patient's load had been lessened, with resulting improvement in his condition. In those cases in which no improvement followed the removal of jaw infection, it is reasonable to suppose that there were other more formidable foci of infection which were the cause of the patient's secondary disease and that possibly the jaw infection resulted secondarily from the other infection. Dr. Hatton will probably tell you that, as a result of his research, he has found in some instances old apical infections which were sterile, and others so walled-in that no escape of bacteria would be likely. This probably accounts in part for the good physical condition of those patients whose radiograms show translucence about teeth with no secondary manifestations. My experience leads me to believe that too much attention is being focused on infections about teeth, which are more easily detected, omitting observation of infections of the sinuses, the nasal fossae, the genito-urinary tract, the gallbladder and other parts of the anatomy. Many persons who have had gonorrhea still harbor the gonococcus, which may cause joint affections years after the initial attack. This is likewise true of nose, sinus, appendiceal and other past acute infections. Much more genuine scientific investigation is

needed in solving some of the perplexing questions connected with focal infections.

C. N. Johnson, Chicago: Dr. Crane's presentation of this subject as it confronts us today is the sanest to which I have ever listened. Whatever findings on this subject may be arrived at by laboratory investigation, there is still another phase of it which must be reckoned with. It is easy to build up a theory on the basis of blood analysis and bacterial counts which reads convincingly, and which impresses the hearer. There is no disposition at this time to minimize their importance in all disease processes, but laboratory findings do not tell the whole story of the behavior of pulpless teeth; nor should they determine our entire mental attitude toward them. With sane and thinking men, the evidence of long clinical experience cannot be ignored in forming an opinion as to the danger or the efficient serviceability of pulpless teeth, and yet, with some of our extremists and alarmists, the aggregate practical experience of many reputable, thoughtful, and conservative practitioners has been cavalierly set at naught, and their opinions swept aside as if nothing had ever been previously known of the subject before the present avalanche of prejudice had developed against the retention of pulpless teeth. Nowhere in our entire history has there been a more deplorable chapter written than that which has appeared in recent years on this subject. A proper attitude on the question cannot be gained by taking a relatively few cases in which pulpless teeth have been an undoubted detriment, and building up a theory of sweeping condemnation, as has been done in this instance. What is the clinical history of pulpless teeth as noted by many careful, conscientious and reputable men? It is this: That when care is exercised in their treatment, the great majority of pulpless teeth behave in such a manner as to prove of the utmost benefit to the patients, and of a negligible amount of harm. It matters not that this statement may elevate the brows and cause consternation in the seats of the mighty. It is profoundly true, and it will be acknowledged as true when this wave of emotionalism and sensationalism shall have passed away—which happily, it is certain to do in the fullness of time. Let me cite the typical behavior of an abscessed tooth with a fistulous opening: It is freed from decay and cleaned in the usual way; some antiseptic is forced into the canal, and through the fistula if possible, and a medicament is sealed in the cavity. On account of the apparent putrescence present, the medicine is changed in a few days and the cavity sealed again. Supposing this fistula heals, and the gum becomes pink and normal in form and color, and supposing, further, that the canal and cavity are filled with painstaking care and the tooth goes on year after year—sometimes ten, twenty, thirty years and longer—with not the slightest discomfort or other evidence of disease or disability, performing effectively the function of mastication all that time, and proving of the utmost benefit to the patient, I want to ask the frank question of those who have been most insistent on the extraction of pulpless teeth if they would consider such a tooth a menace to the patient, and if they would advocate its extraction? If they would, then I must announce myself in vigorous disagreement with them, and in perpetual protest against such a stand. If they would not—if they acknowledge that such a tooth may logically be left in the mouth—then I have only to say that there are countless numbers of pulpless teeth which come under that category, and the sweeping indictment of pulpless teeth which has been pronounced in recent years falls flat to the ground. There are of course exceptions to every rule, and there are teeth that by no means behave as just indicated; but those of us who have been continuously in general practice in one locality for many years, where we have the opportunity of observing these cases, can vouch for the fact that the large majority of pulpless teeth respond to treatment in this way, and remain in satisfactory service to the patient for an indefinite period. The hue and cry against pulpless teeth as a menace to the health of the people is not borne out by clinical experience, and there is surely as much logic in following long continued clinical evidence as there is in pinning our faith solely to the findings of the research laboratory man and the experimental bacteriologist. Every sincere and conscientious man, whether he is a practitioner or a research worker, must fervently hope that the time will speedily come when a more settled conviction and a more uniform opinion shall prevail with regard to this question than exists today, and when that time comes it is the prediction of the present speaker that it will be more generally in favor of, rather than more generally against, the retention of most pulpless teeth.

Edward H. Hatton, Chicago: I have a number of specimens that justify the statements that have been published, and that I have shown to the members of this society. One specimen that Dr. Crane showed,[6] which he classified as a No. 1 granuloma, I think has a separation of the periapical membrane from the cementum. We have been making some experiments recently on pulpless teeth with granulomas taken from people apparently in good health. We have not been able to demonstrate the presence of bacteria by cultural methods in these granulomas and the associated pulp canals in 10 to 30 per cent of the cases. We have also found that only about half of these lesions yield organisms that are virulent enough to produce gross changes in experimental rabbits. Remember these are cultures taken from granulomas at the apices of teeth and from the associated pulp canals removed from people apparently in good health. We have not been dealing with sick individuals. From the histologic point of view, I want to show one slide and make one suggestion as to the mechanism of the production of these regenerations at the apex. This is a longitudinal section of a root that has been treated and filled with guttapercha; the termination of the filling is about 3 mm. short of the apex. The space between this termination and the apex is completely occupied by a rather fibrous pulp devoid of infiltration; that is, there is no evidence of infection, and a rather thick fibrous layer fits snugly against the guttapercha surface. The wall of the unfilled apical portion of this canal contains a record of a rather stormy reaction, following the placing of this filling; for there is a pear-shaped region from which the dentin was absorbed at the time of this reaction. But this denuded dentinal wall has been covered by a rather thick, relatively impervious layer of what I chose to call osteoid cementum from the level of the guttapercha to the apex, and this layer is continuous with the external cementum. This reaction is not only characteristic; I have found it invariably in all the teeth that, from histologic evidence, may be said to have been successfully treated. Others in this country and abroad have

Longitudinal section of the apex of a tooth that has been treated and filled with guttapercha; illustrating the regeneration of the apical region after this operation. *GP*, guttapercha; *AO*, apical opening; *P*, regenerated pulp; *A* to *B*, original layer of apical cementum; *C*, line marking extent of absorption after treatment; *C* to *D*, new cementum on the wall of the pulp canal; *B* to *E*, new cementum on the outside of the root.

6. Photomicrograph of a circumscribed granuloma.

demonstrated this condition. From the histologic point of view, only those teeth can be successfully treated and filled about whose apices this reaction can be produced. It must be clear that such a reaction cannot occur unless there is present at the apex enough intact peridental membrane or pulp to grow into the space immediately adjacent to the filling. It is obvious from this that regeneration of this tissue is hampered or completely nullified if the periapical tissues have been previously replaced by granulation tissue (denuded, necrotic cementum), and if these remnants have been hopelessly damaged mechanically or chemically. I should like to suggest that regeneration of the region at the apex after treatment and filling will not occur in individuals who, because of age, disease or the state of nutrition, cannot produce new deposits of osteoid tissue. Aside from a complete calcification of this space between the termination of the guttapercha and the apex, I can conceive of no more cunning solution to this problem of the reconstruction of the apex, than what I have described; viz., absorption of the damaged dentin and soft tissues, replacement of the absorbed dentin by a thick impervious osteoid cementum and reduction of the diameter of the apical pulp canal. It is plain that if the dentinal tubules are completely closed in this manner; if a fibrous band covers the termination of the guttapercha, and if the guttapercha cone adequately fills the canal, reinfection from the interior of the tooth cannot and does not take place. It is this situation that has convinced me that overfilling is a pernicious practice, and that the filling need not be carried in every case actually to the junction of the cementum and dentin at the apex, provided only that the canal is adequately and completely filled up to the termination of the filling.

Edgar D. Coolidge: I would like first to ask Dr. Hatton if the root he was describing was supposed to have a vital pulp before filling.

Dr. Hatton: I do not know.

Dr. Coolidge: Dr. Crane has been very conservative in his writings. He has not been radical either in his diagnoses or his methods of treatment. He made the statement that frequently writers discuss the regeneration of tissue, or the lack of regeneration about teeth that were pulpless in the beginning, and draw their conclusions according to whether the root canal work is a success or failure, using from the start a wrong premise. In that, I thoroughly agree with him. We are interested in tissue changes and wish to study them. Just as Dr. Crane said, the inherent tissue reaction is what we wish to ascertain. What we are studying, what Dr. Hatton has pointed out is this tissue reaction. When we know how tissue reacts, we will know better how to fill teeth that show a healthy periapical tissue at the beginning. If we eliminate all others, we still have to contend with the class of teeth that appear normal. We will fill this root canal carefully and then, a few years later, we examine it by radiogram. Will we find it healthy or will we not? That, it seems to me, is the test of root canal work. We start with healthy tissue and, after a few years, we wonder whether it is healthy or not. Dr. Hatton has told us that it does not make much difference where the root canal filling ends as long as we do not destroy the periapical tissue by mechanical or chemical irritation or by infection. I believe that is absolutely correct. However, I would not like to leave a portion of the pulp in that canal. If the canal is large, I would try to remove all of the pulp. If it is small, I would remove all that I possibly could, but I do not believe we render the best service to the patient when we attempt to have a beautiful exhibit at the finish and enlarge the canal by means of acids, files and mechanical methods, to the extent that we injure the periapical tissue. I believe that is a mistake, but I think we should attempt to remove all the pulp filaments, and fill the canal to the dentocementum junction, if at all possible. The causes of the conditions around the roots which we call abscess or granuloma we should endeavor to determine. This is difficult for we get a chance to try only once, and we cannot always extract the tooth and send it to Dr. Hatton or others to determine the reason why we have a failure. Many times, in removing a portion of the pulp that is troublesome, even though we think we have removed all of the pulp we will find, if we place a broach in the canal at the next sitting, that we cannot get the broach to the apical end of the canal without causing pain. At times, we grow a little impatient and think the patient is anticipating pain. I have found, in a large percentage of cases in which I was unable to fill the canal at the second sitting, as I wished to, that there was a thickening of the periapical tissue around that root that was

difficult to handle and perhaps a little absorption will follow. I have also found that after carrying a case through to what I thought was a successful conclusion, I have had a little inflammation around the root. The patient will complain of a little soreness, and that frequently is followed by a small absorption around the end of that root. I have also found that, during the treatment of a tooth, if severe pain develops the tooth will show absorption around the end of the root, no matter how careful the treatment. The occurrence of pain during the treatment of a tooth canal is almost always followed by an absorption or thickening in the apical region. Some cases clear up afterward and some do not. The point I should like to have our histologists clear up is this: What is the difference between the case that although handled in an effective manner and apparently properly treated, yet has absorption develop around the root, and the condition which we see in the radiogram and interpret as an infected granuloma? Are all these areas infected? We have found that the method of removing the pulp by pressure anesthesia is dangerous, for two reasons: (1) because of the possibility of forcing infection through the end of the root and (2) because the solution we use may be too strong and may destroy the tissue itself. We believe it is a safer method to inject the solution into the tissues of the gingiva rather than into the tissue of the pulp, and not use any pressure on the pulp. It is a logical conclusion that conductive anesthesia is safer. I do not believe that devitalizing the pulp by means of arsenic is as much the cause of our trouble as we once thought. I have not placed so much emphasis on the complete regeneration of that line around the end of the root, which Dr. Crane calls the lamina dura, as he has. I may be wrong, but it seems to me that if the bone is once destroyed by pathologic absorption, the tissue which is attached to the bone must also be absorbed; and if the two are absorbed, it would hardly be possible to regenerate the two in that relation again. The presence of that line, to me, indicates only the complete regeneration of tissue of the same density surrounding the root; not that the peridental fibers have regenerated. It means that the end of the root has been surrounded by a dense mass of tissue similar to that around the rest of the root. I enjoy working with these cases to see what I can accomplish, but I do not feel that they are representative of what the treatment of pulpless teeth should be or of the class which we wish to discuss. The cases we wish to discuss and have the dentist keep in mind are those that do not show pathologic change in the radiogram. These are the teeth we do not wish to extract, and that we hope will be less frequently extracted in the future.

Dr. Crane, (closing): Dr. Hatton stated that the specimen which I classed as a No. 1 granuloma was one in which there was a denudation or separation of the pericementum. I think the separation took place while the specimen was being mounted, although I do not do this work myself and cannot be certain of that. I have had great pleasure in reading Dr. Hatton's description of the splitting apart of these fibers, because that is just the way I would have it planned out in order to make treatment easier. I await with great interest further communications from Dr. Hatton, because if what he has discovered ultimately proves to be the fact in the majority of cases, I believe we will find that the treatment in Class 1 granuloma is not such a difficult procedure. The reason it is a tentative procedure at present is that we have no means of knowing when the periapical cementum is denuded. As Dr. Coolidge said, so long as the periapical conditions are normal we feel justified in retaining such teeth, but just as soon as the condition is disturbed to the extent that we can see it in the radiogram, then its retention becomes an experimental procedure. It is to be tried, not on the sick but when conditions are such that they seem to justify the retention while an attempt is made to eliminate disease. Dr. Coolidge spoke about the extent of the canal filling, as did also Dr. Hatton. I believe Dr. Callaghan once showed a tooth which was filled just to the end, no more and no less. He said it was the only one he was sure was filled just to the end, and the reason he was sure of this was because he put his thumb over the end while he was filling it. I do not know how much work you gentlemen have done in your laboratories on extracted teeth. If you will take a number of extracted teeth and prepare the root canals as carefully as you know how, without penetrating through the apical foramen, and then fill the canals and cut them open to see how nearly you have filled them you will often be surprised. If you can fill one just right, it will be more than I have ever been able to do, that is with anything but hot pitch, and even

then under the microscope there were many spaces where the pitch was not in contact with the canal wall. I am speaking only of the main canal, not of the little accessory branches that may be there for the accommodation of the blood vessels. It is impossible to fill all the little avenues of a root canal, and as long as that is true, what difference does it make whether the filling goes all the way to the end or whether some of the material flows into some of the accessory branches of the canal? The only difference is that you cannot exhibit the roentgen-ray film, to show your associates what an artist you are. Remember that we do not fill teeth for the roentgen-ray man but for the patient, and just as soon as anything is poked through the end the cementoblast is destroyed and the patient injured. Dr. Coolidge spoke of absorption following pain: Throughout all tissue we get a breaking down and a building up going hand in hand. The osteoblast working in conjunction with the osteoclast is normal. There is nothing erratic about such activity in the periapical tissues. Pain is but the symptom of inflammation, and repair seldom occurs in the absence of the inflammatory reaction. Therefore, pain is not a dire calamity, but the inflammatory process must be checked and kept under control; otherwise, the process of resorption may run wild and defeat Nature's reparative action. There can be no question that many of our efforts at tooth treatment are followed by failure, but because it insults my intelligence to think that the Creator has endowed all other living tissue with the power of repair, but has made the periapical tissues so that they will not repair, I shall continue to treat pulpless teeth, in selected cases, feeling that I shall thus best serve the interests of my patients.

THE ROOT CANAL PROBLEM

By JOHN V. CONZETT, D.Sc., D.D.S., F.A.C.D., Dubuque, Iowa

(Read before the Odontographic Society, Chicago, Ill., April 14, 1925)

DENTISTS have for many years believed that there is a direct relation between infected or diseased teeth and systemic disease; in fact, that there is a vicious circle wherein diseased teeth cause systemic disturbances and systemic dyscrasias react on the teeth, and that they therefore make for continued pathologic reactions each on the other. It was not until the published observations of Dr. Hunter that there was a general recognition of this fact. This publication, coupled with the fact that the roentgenogram was then available and showed many rarefactions at the apices of pulpless teeth; that the researches of bacteriologists showed these rarefactions to be the results of infections and, further, that they identified the organisms isolated from these areas with the organisms responsible for many of the chronic and acute diseases attacking mankind, made it seem a demonstrated fact that areas of infection about the apices of teeth were responsible for many of the diseases with which the human family was suffering. Further, researches by authorities in the medical and dental profession added proof to the foregoing facts by the inoculation of animals with bacteria taken from the apices of teeth or from the pulp canals of persons suffering from systemic disease, the same disease being thus produced in the inoculated animal. Following these disclosures, there was a flood of clinical evidence in the writing of the two professions, detailing remarkable cures that had been accomplished by the elimination of infected teeth. So strong was this evidence, many men in both professions made the claim that it was almost criminal to allow a pulpless tooth to remain in a patient's mouth. The public press and popular magazines took up the tale, and soon the public was inoculated with the idea, and for awhile the dentist that had the temerity to advise the extirpation of a pulp was regarded as a therapeutic heretic. Nevertheless, there were some of the older men in the profession who refused to be swept off their feet by the new movement, for the reason that they had been practicing for so many years, and had seen the results of their work in so many cases in which patients had retained good health, in spite of the presence of many pulpless teeth in their mouths; so they were satisfied that there was much exaggeration, to say the least, in the theory. Since the development of the theory of focal infection, we have seen the ruthless extraction of millions of teeth, good, bad and indifferent. We have seen many patients tremendously benefited by the operation and many more that have had no benefit whatever. We have also had the pleasure of seeing many patients benefited by the elimination of the infected areas through treatment of the teeth without extraction, so that today we are in a better position to reorient ourselves, study the problem afresh in the light of the evidence

of the past and see whether we cannot arrive at a more satisfactory solution of the problem. We believe that the 100 per cent vitality men, who honestly thought that every pulpless tooth should be extracted, are ready, for the most part, to reconsider their position, and to acknowledge that some pulpless teeth can be retained in the mouth without harm to the patient. On the other hand, we are fully persuaded that the men in the profession who felt that all or nearly all of the pulpless teeth could and should be saved are ready to surrender their position; for everyone must surely be convinced, at this time, that there is much truth in the theory of focal infection and that the teeth are a large factor in that problem. Let us not be influenced to too great an extent by clinical evidence, however, for it is possible to mobilize an army of cured patients to support any therapeutic agency, be it mechanical, medical or mental, or pure quackery. It is a fact that from 70 to 80 per cent of all diseases are self-curable, and when the time comes that Nature is ready to effect a cure, when perhaps the patient has been the rounds of many doctors and suffered many things in the hands of many physicians and quacks, the man in whose care he is at that time will receive the credit of the cure, no matter what method or material he may have used. Then, we must not forget the tremendous power that lies in suggestion. It is one of the most powerful agencies for good or for evil in the world, and many of the cures that are effected by physicians and health cults of all kinds are really effected by the power of suggestion and the faith of the patient in the particular method used at the time. Time will not permit us to illustrate this, but numberless cases could be reported in substantiation thereof. Therefore, the fact that many cases have been reported as cured, or tremendously benefited, by the extraction of one or more teeth is not a demonstration of the truth of the theory of focal infection as it relates to the teeth. Were we to depend on clinical evidence alone, we could cite case after case that had not been benefited by extraction; other cases that had been cured by the treatment of the suspected teeth, and others in which the patient had been made worse by extraction. Therefore, it will not be wise to depend too much on mere clinical evidence. Furthermore, it is rather to be expected that many men rushed into print with cases of cures from extractions but were careful not to say anything about the failures they had had in the expected results in other cases. These facts, coupled with a very sincere belief in the value of the teeth to the human animal, have led me to study the subject of diseased teeth with a view to their salvation and use to the patient, rather than to their heedless extraction.

We know that the organisms about an infected tooth are identical with those that cause many of the acute and chronic diseases, such as rheumatism, gastric ulcer, appendicitis, cholecystitis, endocarditis, myocarditis and iritis. But we also find these same organisms in infected tonsils, sinuses, gallbladders and genital organs, as well as a colon overflowing with them. We also know that we have systemic diseases of streptococcal origin in patients whose teeth are in perfect health or who have had no teeth for many years. We also know that teeth with vital pulps, but with cavities of great or small dimensions, have pulps that are infected with the same organisms, and we know that

the pulp tissue is in intimate contact with the circulatory system and that there is little or no defense, in the pulp, against organisms contained therein gaining access to the general circulation.

We also know that dentures worn by patients have masses of bacteria on their surfaces in immediate contact with a mucus membrane that is far from normal by reason of the wearing of a denture for many years, and yet many or the vast majority of these patients, are in perfect health. We also know that the physician is accustomed to see the sick individual; while, for the most part, the average dentist sees the healthy one. The dentist will see thousands of pulpless teeth in healthy patients, and will get the impression that there is little or no danger in an alveolar abscess, infected pulp canal or a pyorrheal pocket; while the physician, seeing but the sick and finding the evidence of infected teeth in the patient's mouth, is impressed with the idea that all infected teeth are a menace to the health. It is my belief that there is truth in both cases, and that eventually the dentist and the physician, working together, will be able to eliminate the teeth that are a menace to the individual, and save the ones that, being of no harm, will be of incalculable benefit to the patient. There should be greater harmony between the professions, and I believe there will be, when it can be demonstrated that the dentist is willing and able to cooperate intelligently with the physician in his efforts to restore the sick to a state of health. This is the prime motive in the presentation of this paper, and I wish to assert that I do not in any manner intend to reflect on the splendid profession of medicine, which has done more for the advancement of humanity that any other body of men or all of them taken together. Never was there a more self-sacrificing group than that composing the profession of medicine, and that they have condemned thousands of teeth that might have been saved was due to the absolute belief that in so doing they were benefiting their patients. If we of the dental profession will attack the problem in the same spirit of service to the public, forgetful of self, we will demonstrate our right to enter the lists in favor of the salvation of the teeth, which it is our duty to do.

If, then there are teeth that are foci of infection and a menace to the patient and there are other infected teeth that are not a menace to the patient, and that can be saved, how can we differentiate the one from the other, and intelligently proceed in the salvation or the elimination of the teeth under discussion?

Sir Kenneth Goadby, in 1920, in discussing the subject of focal infection, said, in substance: "You have a great deal more trouble with focal infections in this country than we do in Europe. It is not a question of the seed but of the soil. The seed is everywhere. You cannot get rid of the organisms; they are in the mouth and on the surface of the body and are contained in most of the food you eat, but they are only pathologic to the individual because of a susceptibility to the organism, and that (pointing to the white bread on the table before him) is your principal offender."

Leaving out of the question the subject of dietetics, which the last remark naturally calls up, let us refer to the subject of immunity and susceptibility. If the organisms are everywhere and we cannot get rid of them; if, as Dr. Hartzell said in discussing Dr. Hall's paper in Chicago in January, there is no use in extracting a tooth that has an

infinitely small number of strepticocci, comparatively speaking, when the colon is a seething mass of streptococci that have the same power to produce the same diseases that the organisms taken from an infected tooth have, it seems that the only reason that any of us are alive is because we have become immune to the bacteria.

Unfortunately, immunity is not universal; neither is it permanent in the individual that is at sometimes immune. I think that we will all admit that there are persons who suffer from the effects of an infection of focal origin, and who, on the removal of that focus, recover. We will all also admit that there are individuals who carry about with them large areas that are foci of infection and yet are in perfect health. But suddenly there arises a something that lowers the resistance of the individual and a sudden onset of some systemic disease is the result.

Price recognizes the immunity of certain individuals at times to the ravages of bacterial infection, and the susceptibility at others. He also believes that, owing to some overload, the immune individual may lose his immunity and become a victim of the organisms that he is harboring in some focus. He believes that the person who develops a well marked granuloma has reacted favorably toward the infection, the system having erected a barrier against the bacteria that will be effective as long as it persists. Other investigators, notably Grieves,[1] Rickert and Lyons,[2] have demonstrated the fact that many of the so-called granulomas are sterile, so it is evident that, in many cases, the immune individual overcomes the attack of the micro-organic invasion. If we were able to recognize the cases in which this power of resistance was present, we would be far on the way toward the solution of the difficulty. Unfortunately, we cannot do so with exactness or without failure. The roentgenogram is a help, but it is only a diagnostic aid; and while it should be used in all cases, it should not be relied on to the exclusion of other diagnostic aids. For this reason, we should disparage the diagnosis of professional roentgenographers who make a diagnosis with no other authority than a roentgenogram and, with perhaps no dental education, will condemn teeth by the thousands to the forceps.

That the inclination of modern research workers and pathologists of known ability is in the direction of doubting the all disease producing powers of teeth with areas of translucency about them is evidenced by the illuminating remarks of Dr. Hatton[3] before the American Dental Association at Dallas, when he said:

> In the hundreds of periapical infections in which I have made examination histologically and anatomically, I have not found that the condition is in reality an abscess, except when there is drainage either into a pulp canal or elsewhere through sinuses. In all of these infections in which there is no measurable, no noteworthy drainage, there is no abscess and no pus. It is wrong, therefore, to say that the apices of such teeth are soaked in pus, because there is no pus there to soak them. On this account, I have used the phrase periapical infection to include all of these conditions, those with pus and those without. Without entering into an extended discussion of this, I cannot let the statement (that the teeth and jaws stand first among the principle locations of primary foci) pass unchallenged. In an illuminating tabulation

1. Grieves, C. J.: J. Dent. Res., 2: 327 (Sept.) 1920.

2. Rickert, U. G., and Lyons, C. J.: Report of Research Committee 9: 300 (April) 1922.

3. Hatton, E. H.: Disc. Buckley, J. P.: Bone—In Relation to the Treatment of Pulpless Teeth, J.A.D.A., 12: 309 (March) 1925.

of the sources of bacteria recovered from the blood by culture methods, in not one instance were the teeth and jaws involved. I do not wish to question the seriousness of mouth infections; yet mouth infection is so common that it is hard to find individuals with infection elsewhere in the body that do not have some evidence of mouth infection. Now, why should these, in every case or in the majority of cases, be labeled primary and the other foci secondary? Isn't it a possibility (and I believe it is in many cases) that the mouth infection is not primary but secondary to infection elsewhere in the body?"

Many of our writers and research workers in the past have insisted that an infected root canal could not be sterilized, but researches conducted by others of more recent date, with an improved technic, have demonstrated the falsity of that position. Indeed, Lyons and Rickert[2] state that the sterilization of the pulp canal is easy and certain when carried out under a careful technic. This is corroborated by Marshall, Blainey and others.

If, then, it is true that there are many infected teeth that are a menace to the system, and that there are undoubted cases of systemic infection and disease following dental foci; and, on the other hand, if it is true that the infection in and about many of these teeth can be eliminated and the teeth restored to health and usefulness, how can we determine which teeth to save and which to extract? In my practice, I have attempted to find a solution to this problem and, in doing so, have evolved the following classification and treatment of the teeth under the various classes, which has been so satisfactory to me that I am glad to give it to the profession, not with the thought that I am giving anything original or specific, for, while we have a large majority of successes, we have a sufficient number of failures to prevent our superiority complex from attaining too large dimensions. And, while the ideal is the perfect filling of the root canal according to the technic advised, we have too many illustrations of failure to fill the canals perfectly to allow us to bring to you a selected number of perfect root canal fillings as depicted in our roentgenograms. On the other hand, we find that the well treated root canal will remain in a state of health and efficiency in the large majority of cases even if the canal is not perfectly filled to the apex.

CLASSIFICATION OF CASES[4]

The classification is as follows:

I. Normal teeth with healthy pulps.
II. Infected pulps, but no exposure from caries.
III. Infected and exposed pulps, with pulpitis.
IV. Putrescent pulps, no apical involvement.
V. Acute alveolar abscess.
VI. Apical innvolvement, small well defined area.
VII. Apical involvement with large diffuse area or necrotic apices.

It is rarely necessary to fill the root canal of a normal, healthy tooth, for to do so would presuppose the wilful destruction of the pulp, which is rarely good practice. In this day of abutments for vital teeth, one can hardly conceive a case in which the destruction of a healthy pulp would be justifiable, and yet the occasion might arise, and if it did, the filling of the root canal should be attended with 100 per cent success. In such a case, the pulp may be destroyed with the aid of pressure anesthesia or by infiltration or block anesthesia. Never, in such a case, should arsenic be used, for no irritant should be allowed

4. This classification was given before the Southern California Dental Association, June 18, 1923.

to enter the pulp chamber. This class should contain the ones in which we should expect the cementum to seal the apical foramen. The researches of Grove[5] and Davis lead us to expect that healthy apical tissue will cause a deposition of cementum around the apex of the tooth in cases in which there is no infection and in which the apical tissues have not been destroyed or atrophied by strong medicaments. Grove's work goes a long way toward reassuring the earnest practitioner that Nature, properly assisted by the dentist, will physiologically seal over the apical foramen with cementum, and make the tooth safe for all time. The work of Davis, in which he advises the amputation of the pulp at about the apical third of the root, is open to many objections, and cannot be accepted without much more evidence than he has as yet produced. I do not think his conclusions sound, and I should not advise any man to go very deeply into the practice until further research by competent men corroborates his findings. The work of Grove is sound, and the student of the subject is advised to read his publications.

The filling of a root canal demands a technic that is as aseptic as that of a laparotomy, and the dentist must be as careful of his asepsis as is a surgeon, as the success or failure of a root canal operation hangs on careful and conscientious observation of all the rules of asepsis. Before the tooth is opened, the rubber dam should be placed in position, and the isolated teeth and dam should be thoroughly washed with alcohol, dried with the air syringe, again washed and again dried, after which the field is washed with a solution of iodin or solution of formaldehyd U. S. P. in 5 per cent dilution. The tooth is then opened with a sterile bur, and, in the case of a tooth infected with caries, the bur should be frequently sterilized by dipping into the molten liquid contained in a Flaherty sterilizer. Instruments should be dipped into the molten liquid every time they are taken out of the tooth and before they again enter the canal. In this way, an asepsis as nearly perfect as possible is always maintained. When the pulp chamber is open, if it is a sterile case, the canals are opened under aseptic conditions, but if it is an infected case, when they are opened, some antiseptic is employed, the pulp chamber and canals being continually flooded with the solution.

In Class I cases, immediate root filling is advised, care being taken not to overfill the canals. In these cases, it is better not to fill to the ends of the roots, that Nature may be given an opportunity to close the apical foramen physiologically with cementum. We know that the apical portion of the pulp does not contain odontoblasts or there would be dentin to the end of the apex. On the contrary, we know that the end of the pulp canal is in cementum, and therefore, cementoblasts are functioning at and within the apex of the root.

The ideal filling in this class would end about 1 mm. from the apex. For the same reason that the removal of the pulp tissue must be without traumatism to the end of the root, the pulp at the extreme apex should not be removed but allowed to function in the closing of the foramen. The pulp chamber should be sealed with a good cement and the crown permanently filled as soon as possible.

Class II. Infected pulps but with no exposure from caries. In this class are those teeth that have been filled and that

5. Grove, C. J.: Method of Pulp Removal to Prevent Apical Infection, J.A.D.A., 10: 93 (Feb.) 1923.

afterwards develop symptoms of infection; those that are slightly affected with pyorrhea, but not hopelessly so, and the pulps of which are infected via the vessels of the periodontal membrane or lymphatics; and those that are infected as a result of traumatism.

If the infection has developed only to the hyperemic condition, but the prognosis is bad, it is better to remove the pulp before it dies and becomes putrescent, and thus infects the dentin. In these cases, removal should never be made with the aid of pressure anesthesia, for the pulp being infected, the pressure made on the medicament would be liable to force some of the pathogenic organisms through the apical foramen, setting up an apical infection. Infiltration or block anesthesia is the ideal in this class, and great care must be exercised not to force any of the infected material through the apical foramen. The pulp removal should be carried out with surgical solution of chlorinated soda, the pulp chamber being flooded at all times during the operation. We do not fill this class at the time of the removal of the pulp, preferring to make several treatments at daily intervals with the surgical solution, to clear up any infection that may remain in the pulp chamber. After several treatments, the root filling is made. The canals are flooded with alcohol and dried, and again flooded and dried, to remove all possible moisture within the canals, and, after this treatment, the canal is filled with the alcohol, so that we have alcohol in it instead of water. Water will not mix with the filling solution; whereas, alcohol will. Therefore, if there is a little remaining alcoholic solution in the canal or in the tubules, it will not only not prevent the ingress of the solvent used for the guttapercha, but will invite its presence by uniting with it, thereby facilitating the filling of the canals and tubuli with the filling material. This method was suggested by Hinman and Johnson.[6]

The canals are now flooded with a solution made by taking 10 parts of iodin crystals, 10 of thymol crystals, 5 of white resin and 100 of benzene. Benzene is used because it is a solvent of all of the medicaments used in the solution and of the guttapercha as well. The iodin crystals deposited within the tubules of the dentin effectually prevent any further activity of organisms that may have escaped the bactericidal action of the antiseptics used in the treatment of the canals, as the means of egress from the tubules is blocked by an antiseptic that inhibits their activity. The thymol acts with the iodin, and also has a beneficent effect on the infected tissue. The resin, sterilized by the iodin and thymol, assists in effectually closing the mouths of the tubules, making any organisms contained therein absolutely innocuous.

This solution is pumped into the canals and is then followed by the filling, which it immedately takes into solution. This is pumped into the canals until a rather thick solution is obtained, when a long thin cone of guttapercha is introduced, and pumped into the canal, followed by other cones, until no more guttapercha can be forced into the canal. The benzene is absorbed from time to time with sterile cotton, and more guttapercha is introduced, until a dry hard root filling is made.

6. Hinman, T. P.: Interpretation of X-Ray Pictures of Apical Granulations, Giving Differential Diagnosis of Cases Favorable and Cases Unfavorable for Treatment and Root Canal Filling, J.N.D.A., 8: 83 (Feb.) 1921. Johnson, H. B.: Possibilities of the Callahan Method, J.N.D.A., 8: 87 (Feb.) 1921.

This gives us a maximum of ease of insertion, and surety of thorough filling and of maintained sterility.

In this class, there is also an attempt not to overfill, for it is hoped that the slight infection of the pulp has been overcome by the mild, but continued antisepsis, and that Nature will function in the closing of the canals.

We do not have much confidence in the closure of the apical foramen by the deposition of cementum in the cases in which there is much infection; for, on the one hand, Nature will not function in the presence of infection, and, on the other, any means that will sterilize the dentin after it has become thoroughly infected will be so strong that it will prevent the functioning of the cementoblasts. Therefore, in all other classes of pulp canal fillings, the attempt is made to fill the canals in their entirety.

Class III. Teeth that have pulps that are infected and show evidence of a pulpitis with an exposure due to caries. In this class, we do not remove the pulp either by pressure or block anesthesia. We still use arsenic, because we feel that it is unwise to enter these root canals until their contents have been sterilized, and it is not possible to sterilize them while the pulp is vital and aching. Neither is it possible to sterilize them by any means known to us; therefore, the arsenical paste is used in devitalizing the pulp. After devitalization, we introduce a small pledget of cotton saturated with formocresol, which is sealed in for one day, after which it is removed, and a dressing of eugenol sealed in for a day or two. The canals are then opened under strict asepsis and the contents of the canals cleaned out with pulp canal cleansers. In this class, the canal is always flooded with the surgical solution of chlorinated soda and the contents are carefully removed. The orifices of the canals are first sought out with fine smooth broaches, which are carefully carried to the ends of the root, the solution being pumped ahead of them, if possible. If the roots are constricted and there is difficulty in cleansing them, we use a 50 per cent solution of sulphuric acid, and if that does not effectually open the root canal, we dry out the acid and try to gain an entrance with a saturated solution of potassium or sodium hydroxid. The acid assists in removing the inorganic portions of the root, but sometimes there are portions of the pulp or organic material that prevent the effectual opening of the canals; when the alkali is indicated instead of the acid. Rhein and others advise the use of the potassium sodium paste, and while this is doubtless effectual, we find that the use of the sodium or potassium hydroxid is equally effective and not so dangerous.

It is needless to say that great care must be exercised in the use of any of these powerful agents, for, if any of them penetrate the apical foramen, there will be a decided apical pericementitis, causing great discomfort. After the canals are thoroughly cleansed, they are neutralized with the appropriate solution and dried as thoroughly as possible.

These are infected canals and must be treated as such. The removal of the infected pulp by means of the acid or alkaline solution will sterilize the superficial layers of dentin in the root canals, but the probabilities are that the deeper layers are still infected, and while, in the great majority of cases, the organisms contained within the tubules will not escape and do any damage if the root canals are filled, it is better to

destroy them if possible, and here the method introduced by Dr. Percy R. Howe[7] is of the greatest advantage. The canals are flooded with ammoniacal solution of silver nitrate, and, with a smooth broach, the air is liberated, allowing the solution to penetrate the roots to their extreme ends. After remaining in the canals for two or three minutes, solution of formaldehyd U. S. P. in a 5 per cent dilution is introduced and allowed to infiltrate the silver nitrate solution. This causes a reduction of the silver, which is thrown down as metallic silver, and the orifices of the tubules are sealed therewith. More than this, if there is any albumin present, the silver solution enters into chemical union with it and creates the antiseptic albuminate of silver, which permanently closes the tubules with an antiseptic plug. Silver nitrate in itself is one of our most potent antiseptics, and any organism coming in contact with it will be effectually destroyed and then infiltrated with the silver nitrate strain.

The application of silver nitrate solution is repeated twice, with the solution of formaldehyd reducing agent, and the canal is again flooded with the silver solution. This time, the silver is reduced with eugenol, which is placed in the canal, and the patient is dismissed until a future sitting.

At the next sitting, the canals are cleaned out and flooded with alcohol, this process being repeatedly followed by flooding and drying until several applications of alcohol followed by drying have been made. The canals are then flooded with the iodin-benzene solution, and the filling is made as before stated.

Class IV. Cases presenting with putrescent pulps, either with or without exposure of the pulp. We will frequently find cases of putrescent pulps under fillings in which there is no exposure, and also in cases of traumatism and of the death of pulps from infection caused by pyorrhea or traumatic occlusion. In any case, the rubber dam is to be placed as in any other case of root canal treatment, and entrance carefully made into the pulp chamber. As there has not been any apical involvment, great care must be observed not to cause any of the infectious material to be forced through the apical foramen. This is the place preeminently for the formocresol treatment. I am aware of the contention that has arisen over the use of solution of formaldehyd in the treatment of root canals, and have carefully followed the work of Grove and Dahlgren; but the results that have been obtained in the practice of treating root canals that contain putrescent pulps, with the formocresol, over a period of nearly twenty years, with no bad results and an abundance of successes, make me seriously doubt the laboratory methods that would discredit such a clinical experience, especially when any other method that has been tried has not given the desired results. Roentgenographic examinations of canals that have been filled for ten, fifteen or twenty years and that were treated with the formocresol solution disclose the fact that the apical portions of the roots are in good condition, equal to that of roots treated by any other method. The solution cannot be indiscriminately used, of course, for it is a potent agent, but properly used, in putrescent and infected cases, it is the best agent for the controlling of infection that I have ever used, and I shall continue its use in a rational manner until some agent as good or better is found.

7. Howe, P. R.: Dent. Cosmos, 59: 891 (Sept.) 1917.

The formocresol is placed upon a pledget of cotton, which is placed in the pulp chamber and sealed in with a good cement. In twenty-four hours, the dressing is removed and part of the contents of the canals is removed. If there is a remaining putrescent odor, a small dressing of formocresol is again introduced for twenty-four hours; then the dam is placed and the contents of the canal carefully removed with sulphuric acid as an antiseptic. Dr. Finn, of Pittsburg University, who enters these canals at the first sitting and cleanses them with sulphuric acid and then places a dressing, has been uniformly successful, but the great danger of forcing some of the septic contents of the putrescent canal through the apical foramen, and thereby causing an acute alveolar abscess to develop, as has happened too many times with the methods used in the past, has always deterred me from following the method, successful though it has been in the hands of Dr. Finn and his pupils. After the canals have been cleansed, if in a tooth distal to the bicuspids, the Howe silver reduction is used and the filling made as in the case of canals in Class III.

If the tooth is one anterior to the first bicuspid, the canals are flooded with surgical solution of chlorinated soda and a dressing of dichloromine-T is made. This is repeated every day for three or four days, when the filling is made as above described.

I have been asked whether I make the filling in the anterior teeth with the iodin solution. In the indicated cases, I always do, and I have yet to find a case of discoloration caused thereby.

Class V. Acute alveolar abscess. These being pus cases, drainage must be established as soon as possible. It is wise to establish drainage through the canal if this can be successfully accomplished. Many times, the canals can be opened and the foramen penetrated and the patient by suction can eliminate a considerable amount of blood and pus. If this can be done, relief is speedy and almost sure. The canal is washed out and a dressing of formocresol placed therein and left for twenty-four hours. In most cases, there will be an abatement of symptoms, and the rest of the treatment will depend on the symptoms developed. If there is swelling and evidence of pointing, the elimination of the pus through a sinus artificially established should be effected as soon as possible.

With the sterilization of the root canals, the apical symptoms usually rapidly disappear, and the canals can then be filled in the manner indicated above.

Class VI. Cases presenting a small area of apical translucency, which we have been taught to call granulomatous, whether they are or not. They are evidently Nature's response to a call for assistance, and there is a walling off of areas of infection, just as in the walling off of infected tissue in other parts of the body. We have been taught that all of these areas are infected and that they are the cause of all sorts and conditions of diseases. The work of more recent bacteriologists, with an improved technic, has proved that the error lies with the men who assert that all apical areas are infected. The work of Grieves, Rickert, Lyons and Howe and their associates proves that many of these cases are sterile, and it is suspected that some of those in which infection is found may be the result of contamination. We do not wish to convey the impression that there are no diseased teeth that are causing systemic infections—far from that; for we firmly

believe that there are many cases of diseased teeth that are the real cause of systemic involvement. The point that we are striving to stress is that not all infected teeth are causing systemic disease, and that clinical evidence should be suspected and largely discounted in the consideration of the subject.

In the treatment of cases of blind abscesses that have a small area of translucency, we confidently expect to have a large percentage of cures, basing our judgment upon the experience of the past. The tooth is opened under aseptic precautions and a small dressing, of formocresol is placed therein and left for twenty-four hours. The tooth is then opened under the rubber dam and the contents of the canal are cleaned out, sulphuric acid being employed as an aid. The technic of removing the contents of the canal is carefully followed, great care being taken not to force any of the material beyond the apex. Gentleness is the order of procedure, and if the canal cannot be opened with a gentle instrumentation, it is closed with a dressing of surgical solution of chlorinated soda and left for the next day. This dressing is replaced every day for several days, an effort being made each time to penetrate farther into the canal. After several days' treatment, the dam is again applied and an effort is made to get to the apex of the root. If possible, and success demands that it be done, the apex is perforated and the surgical solution is pumped into the abscess sac. In this way, the sac is drained, if there is anything in it, and, if not, Nature is stimulated to absorb the sac; for the results of such treatments show that the translucent areas fill in, in the large majority of cases, and the tooth remains in a healthy state of functional activity.

After the penetration of the apex and the treatment with surgical solution of chlorinated soda, the root is treated by the Howe reduction method and filled as any other root would be that had been the seat of infection; that is, with the iodin benzene compound.

Class VII. Teeth with large translucent areas, into which the apices of the roots are seen projecting; those with necrotic apices, as evidenced by the ragged shadows of the root apices, and particularly those with a large diffused area of translucency, indicative of the fact that there is no attempt by Nature to confine the infectious process by walling off the seat of infection with a granuloma, or, if there had been, the effort has failed, and there is no barrier between the infected root end and the tissues of the body. Conservation of these teeth is hopeless, and they should be extracted as soon as possible.

The last class is the really serious one from a systemic standpoint, and such teeth should never be tolerated in the mouth. Many in this class are teeth that have been treated, and have been in the mouth for years. The roots have been filled in a septic manner and when the tooth is opened the contents of the canals are extremely offensive and highly infectious.

This classification and the appended treatment of the various groups is not offered as the ultimate. Indeed, we recognize the fact that many of the areas about the apices are infected and that the hosts are susceptible to the toxins of the contained organisms. If it were possible to settle definitely the matter as to which areas are infected and which sterile, and to differentiate definitely between the patients that are susceptible to the specific organism creating the infection, and those that are not, our task would be much simplified. In our practice, it is the rule to attempt to

save all teeth having small areas of infection, if the general condition of the patient permits, and, to this end, the age, general health and apparent immunity or susceptibility of the patient is taken into consideration. We say the apparent immunity or susceptibility of the patient; for there is no definite way of knowing how a patient will react. The health of the patient, however, is paramount, and if, in the opinion of the physician and the dentist, the teeth should come out, there should be no question about the matter. It is hoped that the time will come when we will be able to say definitely which teeth must be sacrificed and which may be saved, and with this thought in mind, the foregoing is offered and in the hope that the discussion created will stimulate more thought, effort and study, to the end that not so many teeth will be needlessly sacrificed in the future. It is needless to say that the ideal is a 100 per cent denture of vital pulps in sound teeth, and, to this end, prophylaxis should be practiced, taught and preached with all of the enthusiam of our natures.

DISCUSSION

P. G. Puterbaugh, Chicago, Ill.: We are once more reminded that, with all of the sciences at our command, there is no available practical or dependable means for determining the presence or absence of periapical infections. Blood cell changes occur in acute purulent infections but are absent in chronic processes; transillumination may disclose hyperemic tissue changes; and roentgenograms demonstrate the reaction of osseous tissue to irritation, but they do not indicate whether that irritation is traumatic, chemic or bacterial. We are all familiar with the occasional occurrence of periapical bone absorption about teeth containing healthy vital pulps as well as clinically pathologic disturbances in those that are roentgenographically negative. It is therefore sorely trying to one's patience to be confronted daily with the gullibility of many medical and dental practitioners who are wont blindly to accept as conclusive the laboratory findings of the average roentgen-ray technician. If there is any one reason for the advancement of the predental curriculum in dental educational institutions, it is to provide a foundation upon which the profession will refuse to be stampeded by every radical who advocates his newly discovered "sure cure" or "sure method for diagnosis." We must realize that medicine and dentistry are not mathematical sciences: that the patient's balance of resistive forces versus invasion by infection is changing hourly from birth until dissolution. The fact that the so-called granuloma is sterile today is no more indication that it will not be infected tomorrow than the correlative fact that the infected granuloma of today may be sterile tomorrow if conditions are favorable and the patient's resistance is good. Abscesses elsewhere in the body all heal if drainage is provided. Functional and cosmetic damage should not be underestimated in our zeal to remove surgically every vestige of infected tissue. In no other branch of surgery has such heroic treatment been advised (or should I say misadvised) as in the last few years by a stampeded dental profession. It is true that the bacterial flora which develop about pulpless teeth have a great affinity for periarticular, perineural and muscular tissues, and the careful practitioner should look carefully into the general systemic condition of his patients before undertaking the treatment of gangrenous pulps or of chronic abscesses. The observance of strict asepsis as outlined is worthy of thorough endorsement. At our clinic, we have materially reduced the number of treatments required in all classes of cases by enforcing a rigid aseptic technic. We place a preliminary treatment of oil of cloves after removing the leathery decay over those vital pulps invaded by dental caries and remove the pulps under condition or infiltration procain anesthesia at a subsequent sitting. Accumulating evidence would justify the belief that the pulp canal which has not been the site of an infective process has a much better chance of remaining steril than one which has been infected prior to the treatment and insertion of the pulp canal filling. We have been practicing immediate canal fillings in Classes I and II in an experimental way for the past year, but have not had a checkup of roentgenograms over a period of time sufficient to justify a public recommendation. The results so far are highly encouraging. Overfilling is seldom

encountered, and only a small percentage so far have had soreness or other discomfort. The several canal filling materials recommended by Dr. Conzett should meet all requirements in every way, and they are admirably adapted to the various classes outlined. An adhesive filling is very desirable; volatile disinfectants are necessary in canals that have been sites of chronic infections, and iodin and thymol head the list of this class of therapeutic agents. We have used no iodin in our pulp canal work but depend on thymol and menthol for antisepsis. The value of iodin is readily apparent; its antiseptic properties are indisputable and because of its insolubility in water, it is precipitated from the solution when moisture is reached in the dentinal tubules. Here it remains to be slowly volatilized at body temperature and positively disinfects all tissues within its reach. Our faith in formocresol as a disinfectant of putrescent pulp canals likewise remains unshaken and hundreds of checkup roentgenograms taken at six month intervals bear mute testimony to its valuable qualities and should still forever the criticism of the alarmists who formerly decried its use. I would reiterate Dr. Conzett's condemnation of roots that have been divested of their pericemental attachments because of periodontal infections. We occasionally are too much inclined to stretch a point here in order to perpetuate that pet bridge restoration which we constructed only a few years ago. The great truth in the last paragraph should be the slogan for every general practitioner: "It is needless to say that the ideal is a 100 per cent denture of vital pulps in sound teeth and to this end prophylaxis should be practiced, taught and preached with all the enthusiasm of our natures."

C. N. Johnson, Chicago, Ill.: Dr. Conzett refers to Hunter as the man who precipitated this agitation in reference to focal infection in the mouth. It has always seemed to me a most peculiar thing that Hunter's name has been coupled with the kind of infection that has attracted so much attention in recent years. Hunter never referred in any way to periapical infection. He was speaking of the infection that occurs in the mouth as the result of imperfectly made crowns and bridges, and unfortunately referred to it as "American dentistry." I wish to say in all charity that Hunter never knew what American dentistry is. He based his remarks upon the work done in the so-called "American Dental Parlors" in London, which is not representative of real American dentistry. He referred to the "gold traps of sepsis;" not to periapical infection, but he gets the credit today for starting the crusade against pulpless teeth. I do not know that he ever mentioned pulpless teeth in his series of articles. I have probably had as much to do as anyone in trying to stampede this frenzy regarding pulpless teeth. I have never been able to reconcile my experience with the theories that have been promulgated and insisted on in our profession for the last half-dozen years. I believe that I have as keen a regard for the the welfare of the people as any one, but I am going to make this statement right now, and believe it will be borne out by facts, that in the last six to ten years more harm has been done by this propaganda than good. There is no question that some patients have been benefited by the extraction of teeth; but why would they not? In the first place, the patients have been scared to death at the idea of having a pulpless tooth in the mouth. When they are told that their health is being jeopardized because of the poison these teeth pour into the system all the time, and they have the teeth out, why would they not feel better? Many of the cures we have heard about, as Dr. Conzett has emphasized, are entirely psychologic. The quarrel I have with the medical profession, and some of our dentists, is based upon the fact that they never go any farther than the teeth when an infection is present.

I do not like to recite case histories, but will relate just one that I have in mind. Some years ago, a patient who was suffering with some physical ills came to me. There had been a consultation between his dentist and his physician, and they said that he must have his teeth out. The man was much exercised and came to see me. I was sorry he came. I looked over his teeth and said I did not agree with the diagnosis. I did not see anything about his teeth that would account for his trouble, but I told him I might be mistaken. The man said, "I would rather get along without one of my hands than without my teeth. I can get along with one hand, but I want to keep my teeth." I told him he did not need to give up his teeth, and asked him to have his physician call me up. He did so, and his physician said, "Doctor, the man does not take good care of his teeth and I thought they might as well be out any-

way." I asked the physician if the man had told him that he would as soon lose a hand as his teeth. He said he had not. A few days later, I received a letter from the man in which he said, "They are making a search of my mouth to see if they can find the streptococci and if so, I will let you know." I was on my way to take a train to the state dental meeting when the letter arrived, but I was so mad that I took time, and a chance of missing my train, to write him and tell him that they probably would find it, because it can be found in every mouth. I was enraged to think that a man who knew enough to make such a test would make such a statement to a patient. He did not have his teeth out. He went on for a while, but whenever he would feel a little bad or there was little soreness of a tooth he would come to me and say he had better have it out. I grew tired of battling with him, and he finally had four or five teeth out. A few weeks ago, he was taken to the hospital, quite a sick man, and then they found out what the trouble was. As soon as he could sit up, he telephoned me and said, "They have found the trouble now, and it was not the teeth at all."

Now, let us have some conscience in this matter. Let us have the courage to say that we know as much about the teeth as the medical men do, and that we do not intend to be stampeded out of our common sense. We do not wish to be ungentlemanly about this, but we must have conviction, and if we do, we will not stand for some of the things that are being done today.

Another patient came into my office a few days ago. He was the kind who become psychologically sick. If he had been told that he looked bad this morning, he would be in bed tomorrow. He is not an isolated case. He has gone on having tooth after tooth out on the advice of his physician, and he came in the other day and said his physician had told him that he could not expect to be well because he did not have enough teeth to masticate with. A short time later, his physician told him that he must have every pulpless tooth in his head out. A careful examination showed one pulpless tooth. I told him to take a message back to his physician from me but I do not think I had better repeat that message. The physician now says he must have some dentures. I will try to insert some, but no matter how well I do it, the man will be worse off than before he had his teeth taken out.

G. Walter Dittmar, Chicago, Ill.: In his closing remarks, Dr. Johnson arraigned the physicians, and while, in too many instances, I think he is right and that we have radical physicians who are going to the extreme on the subject of pulpless teeth, I can, to an extent, be charitable to those men, for many of them have had little or no dental training and know practically nothing about dentistry, but I have absolutely no patience with those dentists who advocate that every pulpless tooth be extracted, regardless of its condition. I cannot understand those members in our profession who have any practical knowledge of dentistry, or know anything about dentistry, who take a position so radical. I cannot conceive how, in the light of our present knowledge, members of the dental profession can be so blind as not to realize that millions of pulpless teeth have been saved and made useful and comfortable, the roentgenograms showing normal conditions in the periapical region—pulpless teeth whose roots were filled twenty, thirty, forty or more years ago, still doing good service and in healthy condition. I fully realize the dangers that exist in badly infected teeth and believe a dentist has no right to jeopardize the life of a patient by retaining teeth that cannot be made healthy and safe, especially when the patient is well along in years or in ill health, but to take a position that every pulpless tooth is a menace to health and must be extracted, or make the more ignorant statement that a pulpless tooth is a "dead tooth," when there is no evidence of periodontal destruction, is, to my mind, propaganda that is nothing short of criminal.

Sidney J. Knowles, Chicago, Ill.: One thought Dr. Johnson brought out that impressed me was that we are all condemning the physician, for his radical stand in condemning pulpless teeth. I think it is up to us to show the physician what we are doing, in successfully treating some pulpless teeth. I have shown physicians some roentgenograms of the teeth, demonstrating different conditions before and after treatment, which they did not know was possible. I think we should cooperate with the physician and show him what can be accomplished. Physicians talk about crowns and condemn them, just because they are crowns. I have discussed this with them several times and have shown

them that it was not the crown they were talking about, for crowns and bridges can be made perfectly safe. They often take the stand that crowns and bridges must be taken out just because they are crowns and bridges. We all know that many factors enter into this problem of pulpless teeth, but I still believe it is possible to conserve many pulpless teeth with safety. When a tooth shows a questionable area, if it is a very important tooth—all teeth are important, but some more so than others, for example, the posterior abutment of a bridge—I chose to watch that tooth. If it can be treated by proper care of the root canals, and at the end of six months the roentgen ray shows there has been no appreciable degenerative change, I am willing to allow the tooth to remain. If there has been a progressive degenerative change, I look on it as an active infective process and believe the tooth should be removed. I have had good results from this method and think it is a satisfactory way to handle many cases; for I have had a number of cases thus treated show a building up of bone about the root. There are many men who think that all pulpless teeth should be removed. They are correct in some instances, but if Nature shows a tendency to bring about a constructive change, we are justified in leaving such teeth. In other instances that are questionable, we take them out, because they are of lesser importance, but often we have a tooth that is worth any five teeth in some other situation, and I think we should make a great effort to save it if we can. Of course, the physical condition of our patients plays an important part in all our decisions, but we should remember that Nature does a great deal if given a chance.

Donald M. Gallie, Sr., Chicago, Ill.: The profession is getting back to a more sane consideration of the root canal problem. They are beginning to believe again that many pulpless teeth can and should be saved. I have an opportunity every week of seeing the results obtained in our therapeutic clinic at the college. The iodin treatment is the one in favor there. We still hear a great deal about unreasonable demands of some physicians regarding the extraction of all pulpless teeth. However, I think we all agree that they are not so radical as they were a couple of years ago. The conscientious medical man is desirous of working in harmony with the dentist. I think the greatest menace is the dentist who is playing on the fears of his patient and advising radical procedures. Recently, a patient of mine went to a sanitarium in Milwaukee for some systemic trouble. One of the first tests she underwent was a roentgen-ray examination of every part of the body. They found four pulpless teeth out of thirteen in the upper jaw. Three of these teeth had excellent root canal fillings with no roentgenographic evidence of root end trouble. They advised the extraction of all the upper teeth. Naturally, this was a shock to the patient. She refused to sanction such a procedure. They advised her to consult a medical man here. She did so, and he confirmed the advice of the Milwaukee man; but she is not going to have the thirteen out. There is no doubt that in the past too many pulpless teeth were allowed to remain and give trouble. Root canal technic was not comparable to the technic of today. It remains for us to follow in every detail the methods advocated by such men as Dr. Conzett. If this is done, we will save many teeth that a few years ago were ruthlessly sacrificed.

William J. Tuckfield, Melbourne, Australia: I wish to congratulate the society on its reorganization. I can remember, many years ago, when I was quite a young man, reading about the Odontographic Society of Chicago, and I am glad that it has been reorganized and came into being again. It has been a great pleasure for me to hear Dr. Conzett address you on such an important subject. We in Australia are just as interested in this all-important subject as you are, but, being so far away, it is somewhat difficult for us to appreciate the reasons for the stampede. I have had the opportunity in the last few months of traveling from Dallas in the south to Toronto in the north and have heard this subject discussed very freely and frankly, both in society meetings and in private offices, and I have heard views expressed which differed very greatly from those expressed by Dr. Conzett. I feel that the views of Dr. Conzett are very sane and I think that there has been a strain of pessimism in regard to this subject throughout the world. The pendulum swung very far toward the extraction of all pulpless teeth, and though I have heard very strong arguments regarding this treatment, I find that on the whole the trend of the pendulum is in the other direction; that is, toward the belief that great

care must be exercised in the selection of teeth to be treated. The case is not proved for the extraction of all such teeth. I have read a paper entitled, "Fads," in one of our journals, and to my mind there is no profession worse than ours for following the newest fad. I cannot agree with the 100 per cent man. There must be exceptions to every rule and I feel that Dr. Conzett's paper will give us food for much thought and it will be a valuable contribution to ths important discussion.

Charles E. Jones, Chicago, Ill.: I have been dealing with the various classes of cases mentioned by Dr. Conzett, for several years, and have followed his line of therapeutics pretty closely. I now practice, whenever possible, immediate root filling, following block, infiltration or pressure anesthesia, and after watching these cases closely for a number of years, I have yet to find a rarefaction, or pathologic process of the apical end. I have seen some wonderful relief in neuritis, following the removal of pulpless teeth with apical and bone involvement, but I have never seen a chronic case of arthritis relieved to any marked degree by the removal of a tooth. When a patient is suffering from acute neuritis, I believe that the suspected tooth or teeth should be removed.

Louis Schultz, Chicago, Ill.: The dental profession is returning to the sane, rational treatment of teeth when such treatment is indicated. They do not as a body subscribe to or practice the 100 per cent vitality fad, the easy method, if you please, but are doing work that must be performed with the utmost care if it is to be a real service to the patient. That this does not apply to all is certain, but it does apply to many. A great deal has been said about physicians ordering this, that and the other thing done by the dentist, which emphasizes that closer cooperation is needed between the medical and dental professions. Fairness demands that the physician refer such cases to the dentist for diagnosis and proper treatment without giving further advice, just as much as the dentist should refer an appendicitis case to the physician under the same terms. The men who do not know of the ability of the conscientious dentist to cope with these things and properly to evaluate dental roentgenograms do not realize what we can accomplish. Just because we happen to see a dark spot around a tooth, does that condemn it, or does that mean that it is the cause of the disabilities from which the patient suffers? Again, there are many cases showing rarefaction about the teeth in which the immunity of the patient to the infection, as Dr. Conzett so well said, is largely responsible for the absence of trouble. If we were not endowed with the immunity we have we would not be here. As an example, one may cite the case of the American Indian and tuberculosis. So it is with the streptococcus. Some individuals have an immunity to those germs which others have not. The decision as to which exposed pulps and pulpless teeth should be treated and which should be extracted demands good judgment. A patient suffering from a disease which is undoubtedly the result of focal infection, whose teeth are the seat of infection and whose other infections, if any, have been cleared up without relief, should have the teeth extracted. I would rather see those teeth sacrificed than see the patient die because of the teeth. In deciding on the treatment of pulpless teeth, we should be guided not only by the dental findings but also by the general state of health of the patient; for there is a vast difference in treatment of the patient who suffers from a disease which may be the result of a dental focal infection and the patient whose general health is good, and that difference should govern us in deciding which teeth should be sacrificed and which should not. The size of the defect as shown by the roentgenogram does not necessarily bear any relation to the amount of mischief caused thereby. Some small appearing areas about some root ends may well be the cause of widespread mischief, demanding the extraction rather than an attempt at treatment of such teeth. Then, there are cases in which the root end is partially absorbed. Those teeth do not recover; they are a menace, and should be removed. I realize that it requires much more labor to save teeth than to remove them, but we should not ignore the fact that teeth are very useful organs and that the destruction of the masticatory apparatus may become a serious matter for the patient. I recently read an article in a medical journal warning against this wholesale destruction of teeth, and stating that patients came to the author of that article for treatment of dyspepsia and other ills, the result of their inability to masticate. I wish to make a plea for the root canals that may be saved. Before we undertake any such treatment at all, we should examine the teeth clinically, including roentgenograms. We should decide

how well these canals may be cleaned out and filled, and then, in suitable cases, follow the method Dr. Conzett has described. Such action will prove of the greatest benefit to our patients and give us the satisfaction which comes from honest work well done.

Dr. Conzett (closing): I said that I did not believe clinical evidence cut much figure in this proposition, for the reason that we can assemble cases on all sides. An Irishman, an old patient, came in and wanted to have his teeth examined. I found a few cavities and told him that he would have to have an appointment. He said, "All right, but I have a little soreness down here (indicating the lower jaw)." I told him that I believed he had an unerupted third molar, but he said it could not be for he had had the tooth out for years. I told him that, nevertheless, I believed this was the case and that we would find out. I made a roentgen-ray examination, and there was an unerupted third molar. I cut through the gum to see what would happen. After I had done this, the man said, "Doctor, I have a goiter. My doctor sent me down to Des Moines to have this examined and find out about it, and then I have some trouble with my ears and my doctor says I will have to come down and spend about three weeks here to have my ear treated." I told him all right and that I would see him again. I heard nothing from him, and he did not come back until after six months, when I found the same cavities, and I told him again that we would make an appointment for the cavities. Then he asked me, "How about the tooth you operated on last spring?" I looked and there was a beautiful third molar, perfectly erupted. The man said, "You told me that I would have to come back to make a bridge. You remember I had a goiter that I had to have treated, and that I had trouble with my ear; now they are both cured." Dr. McCollum told me of a patient who consulted him and told him that a physician had said that she must have her teeth out because they certainly had something to do with her illness. The mouth was the worst he had ever seen, with pyorrhea, crowns and bridges; he said the patient must have the crowns and bridges out. Dr. Price who was present, asked if she had them out, and McCollum said, "No." Then Dr. Price said, "And died as a result of her folly," but McCollum said, "No, she recovered."

There is clinical evidence for all sorts of cases. If patients get better, we are greatly pleased; but they do get better in many instances whether we take the teeth out or not, and in serious cases even. I have seen many cases in which the teeth were infected but the patients grew better even if they were not taken out. We do not know that hopelessly infected teeth should come out, if they cannot be cured, but I know and a good many of you know that there are infected teeth that can be treated and saved and that as a result systemic diseases clear up. We may treat those teeth and clear up the focal infection, but the something that is causing the systemic disease is still there, and how are we going to overcome it? Then the teeth are taken out, and the patient may or may not get well as a result. A young girl with severe endocarditis was told by a physician that her teeth must come out. One of my assistants looked at the case and said that he did not dare take the teeth out. The physician insisted. He finally took one tooth out, and immediately the temperature jumped up to 102 F. The patient died the next week. I do not say she would not have died anyway, but these things happen. In another case, a patient, for whom I did a good deal of work, crowns, bridges, and so on, soon afterward returned to me and said, "Those teeth must all come out." I asked why and she said, because her doctor said so. I asked her if he had made a roentgenographic examination. "No, but he is a doctor and he knows." I said, "I am a dentist and do not know, but I would not say that they should come out if I had not made a roentgenographic examination." Her sister was with her and seconded the physician's advice. They went to another physician, who said the teeth had nothing to do with the trouble, that the patient had an abdominal tumor and must have a laparotomy. I advised that, before this was done, she should have two teeth removed from the lower law. They went back to have this done. The dentist called me up and said, "Are you going to take those crowns and bridges above off, or shall I do it?" I asked him why and he said the woman wanted all of her teeth out. I told him I would wash my hands of the whole thing. He took out the teeth, and she brought them to me. I never saw more beautiful roots on any teeth in my life, but she had them all removed just because one physician said so, even though another man of excellent repute in the town said they had nothing to do with her trouble.

RADIOGRAPHIC INDICATIONS AND CONTRAINDICATIONS FOR SURGICAL INTERFERENCE

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(Read before the American Dental Association, Louisville, Ky., Sept. 22, 1925)

THIS subject "Radiographic Indications and Contraindications for Surgical Interference" is suggested for discussion by the lack of agreement on it, and the irrational views which have been expounded. A great variance in the procedure advocated under conditions of typical similarity creates perplexity throughout the profession when there should be definite rules for guidance. While patients may obtain almost as many diverse opinions as there are men consulted, they cannot be expected to have confidence in the judgment of the profession or believe oral diagnosis to be upon a sound basis. The conflict between the extremes of radical specialists and ultraconservative, procrastinating general practitioners deprives many patients of needed aid. The radiodontist is interested in this subject because he is frequently consulted regarding treatment, and, as one without "an ax to grind" or a chisel to sharpen, his advice is likely to be influential, and should be correct.

To endure, every branch must conform to the fundamental principles of the science or art of which it is a part. In oral surgery one must adhere to the principles of general surgery. This is not always done, since it entails as a prerequisite thorough surgical training, which has not been a part of the preparation of all who attempt oral surgery. That the results are not more disastrous is due to the physical reparative forces which surmount the impediment of improper treatment. Vital resistance has ever been the benevolent guardian of mistreated patients, and the merciful salvation of bungling surgeons and empiric therapeutists.

Whether or not surgical intervention is indicated in the correction of deformity, removal of a foreign body, repair of an injury or eradication of disease is a matter of diagnostic discrimination. In the examination of osseous structures, radiographic evidence is a decisive diagnostic factor. It may verify, modify or contradict the clinical evidence, but, when correctly interpreted, supplies conclusive indications or contraindications for surgical interference.

The early surgical repair of the congenital defects cleft palate and harelip has practically no contraindications, and the results are incomparably superior to the alternative of an artificial obturator. Malignant growths and traumatic in-

juries of the jaws may be dismissed as having definite indications for surgical treatment, although radiographic examination is essential in determining the character and extent of the lesion. It is toward conditions about which there is controversy regarding operative procedure that this discussion is directed.

UNERUPTED TEETH

A rather frequent perversion of dentition is the delayed eruption or noneruption of teeth. These may be supernumeraries or teeth of the normal quota. They may be malposed, impacted or widely misplaced. Although the presence of an unerupted tooth is an undesirable complication, whether or not the operation for its removal is warranted should be considered. The determining factors are: the evidence of disturbance; the probable developments; the location and anatomic relations, and the age and condition of the patient.

The significance of unerupted teeth and pulp stones as a source of reflex disturbance has been greatly exaggerated. Although it is possible for a misplaced tooth to cause local disorders, referred pain or profound neurosis, the occurrence is sufficiently rare not to be regarded as imminent or even quite probable. Neurotic disturbances of obscure origin indicate radiographic investigation for unerupted teeth, but the removal of teeth for relief of such conditions should be classed as experimental exclusion with a guarded prognosis. Third molars are more likely to be the source of reflex disturbances than are the cuspids or other unerupted teeth, because of the greater resistance imposed and the proximity of the mandibular nerve. In addition to nerve irritation, a misplaced tooth may cause malposition or decalcification of other teeth, deformity of the alveolar process, local impairment of tissue resistance or the development of a dentigerous cyst. In order to estimate the effect of an unerupted tooth on adjacent teeth, the precise localization is required. A deficient radiographic examination may lead to an erroneous diagnosis of impaction, which could be avoided by accurate localization. This requires lingual views at different angles of projection, and occlusal views. Stereoscopic views are unreliable for exact localization.

The development of a dentigerous cyst is a possible sequel to the delayed eruption of a tooth, particularly in the region of the angle of the ramus of the mandible. The most plausible explanation for the origin of a dentigerous cyst is the proliferation of epithelial remnants from the enamel organ. The tendency for cystic involvement of the ramus region may be explained by the preponderance of cortical bone in this region presenting greater resistance to dentition than other parts of the mandible or the maxillae. When undiscovered until subjective symptoms are manifested, the cyst has produced extensive osseous destruction, with susceptibility to fracture, and extirpation requires a formidable operation. The early diagnosis of cystic development is advantageous, but the physiologic osteoclasia or radiolucent zone around the crown of an unerupted tooth should not be mistaken for a cyst. This error is not unusual, and the condition is some-

times cited as an indication for the removal of a harmless tooth.

An impacted third molar predisposes the second molar to erosion and caries; it may be a contributory factor in malocclusion, and, when partially erupted, is prone to become the seat of septic focus with severe acute exacerbations and the ultimate destruction of the process at the distal of the second molar. To thwart these pernicious tendencies, the early removal of third molars in unfavorable positions for eruption is indicated, unless access would cause unwarranted injury. Although there are technical difficulties in the removal of partially developed teeth, these are counterbalanced by the favorable texture of the bone, the reparative vigor of youth and the prophylactic phase of eliminating a potential source of disturbance.

Unerupted incisors and cuspids are rarely responsible for reflex disorders or associated with dentigerous cysts. Their most common detrimental influence is the forcing of adjacent teeth from the normal position. Under favorable conditions in youth, they can be erupted and brought into functional relations by orthodontic treatment. The removal of unerupted cuspids for adults may result in greater injury than benefit by impairing the support of other teeth. The thin alveolar process in this region is easily injured, and in adults is not rapidly repaired. Even when the gingival tissues are not molested and trauma is minimized, the operation may cause the premature loss of adjacent incisors or bicuspids.

The radiographic indications for the removal of unerupted teeth may be summarized as early operations for third molars posed unfavorably for eruption or when there is insufficient space for their accommodation in the occlusal plane; and any tooth not amenable to orthodontic treatment that is materially changing the positions of other teeth, which is associated with a dentigerous cyst, or suspected of being responsible for local or reflex disturbance. The contraindications for the removal of unerupted teeth are: radiographic and clinical evidence of innocuous status, anatomic relations which render the probability of damage greater than benefit, and decreased reparative efficiency proportionate to the age. The routine application of radiography is the only means of revealing the presence of unerupted teeth, for the exercise of operative discrimination before attention is directed to them by injurious manifestations. As long as most dentists employ radiography only as the last resort, unerupted teeth will remain a complex problem.

CURETTAGE

A controversial question is the advisability of curettage in the removal of septic teeth. The argument for curettage is the immediate eradication of diseased tissue to promote regeneration, and prevent septic crypts being enclosed within the bone. The argument against curettage is the destruction of healthy process for access, the danger of producing an acute exacerbation and the significant proportion of physiologic repairs following simple extractions.

Curettage is indicated in ratio to the extent of the involvement, and the de-

gree of demarcation between the diseased and the normal tissues. A pathologic area larger than the crown of the tooth from which it orginates may not have adequate drainage through the alveolus. A proliferation of the periodontal membrane (more correctly termed a periodontoma than a granuloma) encompassed by sclerotic bone, or an area of rarefying osteitis circumscribed by a zone of condensing osteitis, can be curetted with less risk of inflammatory reaction than in a diffuse involvement of indefinite outlines. Cysts of typical development conform to the description of a size larger than the crown of the tooth and a boundary of dense bone. They require liberal access for complete removal to prevent recurrence, but the bone of the cavity walls should be stimulated only by delicate curettage.

Curettage, when indicated, should be limited to diseased soft tissue and the partially decalcified bone, avoiding intrusion on active leukocytic defense. In an acute infection or a severe subacute attack, curettage is especially contraindicated, and even the extraction of the tooth should be postponed until the acute stage subsides if drainage and relief can be secured by other means. Surgical interference at the seat of intensive combat between pathogenic bacteria and leukocytes is precarious, and justifiable only in emergencies. Osteomyelitis imperatively contraindicates surgical interference except for drainage, until sequestrums are formed or there is prolonged delay in sequestration.

Thorough curettage by inspection cannot be accomplished through the alveolus, and when the external plate is removed for access, there is additional bone to be rebuilt, or the contour of the alveolar process is altered. The latter usually occurs because of partial collapse of the periosteum, which molds the regenerating bone. The irreparable damage from excessive alveolectomy has been demonstrated, and, relatively, this is the result of excising the external plate, particularly of a maxillary cuspid.

Drainage and removal of the cause is rational treatment for a localized infection. This is attained by the simple extraction of a septic tooth, which, in the absence of special indications and when developments are kept under observation by subsequent radiographic examinations, is acceptable, conservative practice. Postoperative radiographic examinations are generally neglected, but should be adopted as a regular practice in conscientious service. Immediately after the removal of teeth, a radiographic examination should be made to determine whether or not fragments of filling material, tooth or roots remain in the alveoli, and as a record for comparison in subsequent examinations. It is the duty of the operator to remove root fragments at the initial operations. Retained root fragments may prove to be a source of disturbance, and are more difficult to locate and extricate after the alveoli are obliterated. Leaving root fragments unsuspected by the patient or telling the patient they will move to the surface is dishonorable and cowardly practice. When an operator, usually with pride in his skill, attempts the removal of a tooth, he should assume the moral obligation of performing the operation or refer the patient to someone who will.

Within six months after the operation, another radiographic examination should be made to disclose the progress of repair. If an evidently septic crypt exists at this time, it can be curetted through the external plate, or, when in the region of the lingual root of a maxillary molar, through the internal plate. The ardent advocates of curettage discover and advise the opening of alleged pathologic areas in edentulous regions which are invisible to most other experienced observers. They suspect retained infection in slight irregularities of regenerated bone which are much less conspicuous than the normal range of variation. Bone repairs are not always perfect in pattern or of the same density as adjacent bone, and constant structural uniformity following curettage has not been demonstrated. When a pathologic involvement from a septic tooth indicates curettage, the tooth may be removed with the least possible trauma, and the curettage performed through a direct opening in the external plate after the extraction wound has healed. Men of exceptional skill may be successful with radical methods, but modified procedure is safer for the average operator.

ROOT RESECTION

After the general enthusiasm and the customary reaction, root resection has unjustly fallen into disrepute. This is a peculiar phase of the present surgical era in dentistry, doubtless because technical deficiencies are exposed by the operation, and dental conservation is repugnant to the recently acquired surgical temperament. When conditions are appropriate, root resection is consistent practice, since it permits the eradication of diseased tissue, and intercepting of the origin of infection. The operation is indicated for important accessible teeth with unimpaired cervical periodontium, and is especially indicated when the pulp is lost before completion of the root.

An essential feature to the objective of the operation is an amalgam (preferably) copper cap for the root, in order to seal the dentinal tubuli and prevent reinfection. In contrast to the vacillating men who repudiated this operation when bacterial cultures were obtained from the regenerated bone, men of sound judgment are employing the method successfully. Apparently, the oral sepsis paranoiac is the only medical enthusiast who is not content with cure and prevention of disease, but has a futile ambition to sterilize the living human body. Every effort should be made to eradicate disease, but function, esthetics and mental tranquillity have priority over prophylactic sterilization.

GINGIVECTOMY

The surgical elimination of pyorrhea pockets, which for brevity may be called gingivectomy, offers advantages which indicate the more general employment of the method. It is obviously inconsistent to adjust occlusion and plane roots, but leave a detached gingival flap and diseased bone. The presence of a protected recess for bacterial and food débris is not conducive to the control of a degenerative process.

Apparently, the fanatical quest of periapical infection has, by distraction, produced an utter disregard for the injurious effect of marginal infection. It

is illogical to explore regenerated periapical bone for pathogenic micro-organisms and ignore gross invasion of the marginal process. The abused pretension that the escape of pus nullifies action of a chronic suppurative infection is not compatible with fundamental pathology. The presence of infected fibrous tissue, subjected to impacts and heavy pressure, and partially decalified bone contiguous to lymphatic and a profuse capillary circulation is a serious danger despite intermittent and inadequate drainage. Pyorrhea alveolaris is highly polymicrobic in character, including the bacteria common to metastatic infections and those accused of selective and alterative propensities. Twenty distinct bacteria, with staphylococci and streptococci predominating, have been isolated from pyorrhea pockets. A periodontal abscess on a tooth with a vital pulp is a clinical revelation of the virulence of chronic marginal infection.

After removal of the gross calcareous deposits and excision of the gingivae and gums to the border of sound alveolar process, the diseased marginal bone can be curetted. A cement protection of the wound for a few days facilitates repair, and sutures may be required in extensive operations. The radiographic evidence of marginal bone destruction, particularly of a necrotic type, under a fold of pathologic tissue, indicates the operation. The contraindications are insufficient support to justify retention of the teeth, and the unsightly exposure of maxillary incisors and cuspid roots which are not covered by the lip.

CONCLUSION

This paper may disappoint some zealots by dealing principally with conservative rather than with spectacular operations, but the conservation of function and tissues is a distinguishing surgical refinement. Block anesthesia and the superficial hospital contacts of arm service have bred a surgical lust among dentists which must be repressed and directed into beneficial service. An amateur oral surgeon with a collection of dazzling instruments, a near nurse and a hemorrhagic urge, who has never repaired a cleft palate, cultivated a bone graft or ligated an artery, but revels in destructive excursions where no major vessels are to be encountered, is a menace. Perverted surgery has always been a notorious laity intimidator and fee fertilizer, and, having become epidemic in dentistry, it jeopardizes the integrity and usefulness of the profession. From the proclamation of professional stationery and unprofessional cards and signs, one may believe there are now more oral surgeons than dentists; and there is such urgent need of competent dentists. Dental education is responsible for some erroneous tendencies, but it is not accountable for the neoplastic development of the degree of doctor of dental surgery whereby the hypertrophic caudal appendage sways the professional body. The classification of radiographic indications and contraindications for surgical interference will exert a disciplinary influence on the prevalent indiscretions, sometimes designated by less charitable terms and attributed to ulterior motives.

DISCUSSION

E. W. Browning, Salt Lake City, Utah: When a paper is written, it is an invitation for criticism. It has always been my contention that a discussion should consist of constructive criticism rather than praise for the essayist. Dr. Simpson's paper gives room for both. But as time will not allow comments on what I consider the good points. I shall

confine my remarks to criticism. Dr. Simpson's opening remark that "Patients may obtain as many diverse opinions as there are men consulted" is very apropos. As long as we continue to differ so widely in our opinions, there will be a great lack of confidence in us as dentists. The statement that "as a source of reflex disturbance, the significance of unerupted teeth and pulp stones has been greatly exaggerated" is erroneous; in fact, we have only grazed the subject, and the future will demonstrate that the significance of these teeth, instead of being exaggerated, has been greatly underestimated. I should like to have Dr. Simpson explain why, in his opinion, impacted lower third molars are more likely to be the source of reflex disturbances than are cuspids. It has been my opinion that the nerve supply is greater in the region of an impacted cuspid than in the region of an impacted lower third molar. In regard to greater resistance being imposed, it seems to me that the tooth meeting with the least resistance would be more liable to change its position and would therefore be a greater source of reflex disturbances. Dr. Simpson, in speaking of Nasmyth's membrane being mistaken for a cyst, says "This error is sometimes an indication for the removal of a harmless tooth." He does not mention the age of the patient. I hope he means one under the age of 21 years. I do not believe that any unerupted tooth after that age is harmless, and many are harmful before the age of 21 is reached. We must admit that the removal of unerupted cuspids in some cases has caused the loss of other teeth. But should this condition be blamed on the operation or be laid at the door of faulty technic? Have we not all seen premature loss of the adjacent incisors and bicuspids through the retention of an unerupted cuspid? My experience has been that, when extreme care is used in performing the operation, the removal is by far the lesser of the two evils. I agree with Dr. Simpson that curettage is contraindicated in an acute infection, although even that is debatable. But I do think that we are lax in that we many times fail to advise the patient to have the socket curetted at a subsequent setting. In years gone by, before the advent of our present day methods of anesthesia, it was common practice for the dentist to advise the patient against the removal of the offending tooth. I know of no place in general surgery where such advice is given. I am therefore forced to believe that this advice is sometimes given because the dentist knows he can not properly anesthetize in that area. As the only other means of relief from pain is incision, and as incising only affords temporary relief, I contend that relief must be obtained by the removal of the tooth. In regard to root resection, which Dr. Simpson praises so highly, we must admit that experience is the best of all teachers. And the experience of all of the operators with whom I have come in contact is that they have had too many disastrous experiences with this operation to give it any consideration. The microscope has proved that, on reoperation in these cases, we find 100 per cent infective. If that is the case, and the patient has some systemic involvement, we are not justified in retaining the tooth. If the so-called vacillating men who have repudiated this operation were as blood-thirsty as Dr. Simpson has pictured them, I believe we would have 100 per cent root resection operations and no extractions because certainly one's lust for blood and one's financial gain may be gratified many times more by this operation than by any method of extraction. I hope I may not be classed with what the essayist calls oral sepsis paranoiacs, but I certainly am medical enthusiast enough not to be content with our present day cure and prevention. I have no ambition to sterilize the human body, although I wonder if, in a great many cases, even sterility would not be a good thing. The statement that "every effort should be made to eradicate disease, but function, esthetics and mental stimulus have priority over prophylactic sterilization," is inconsistent to say the least. I feel certain that Dr. Simpson does not mean what he says; and I hope that he will clarify this statement. In reply to Dr. Simpson's closing statement that "this paper may disappoint some zealots by dealing principally with conservative rather than spectacular operations, but the conservation of function and tissues is a distinguishing surgical refinement," I will state that I must admit that I am a zealot because I certainly

am disappointed in the paper. In the first place, the title of the paper reminds me of a play that I attended whose title had no bearing on the subject; and although the performance was entertaining I was disappointed. Dr. Simpson in his enthusiasm forgot that the title was "Radiographic Indications and Contraindications for Surgical Interference." In regard to his dealing with conservative rather than spectacular operations. I know of no surgery in the mouth that is more spectacular than the two operations that he advocates, namely apicoectomy and the flap operation. A really reputable and scientific operation never falls into disrepute.

James A. Blue, Birmingham, Ala.: There are few impacted or malposed teeth that are not causing, or will soon cause, dire symptoms, the most common being reflex, neurotic pains about the head and face, often summed up by the patient as headaches. There are often infected areas about the crowns of these teeth which are not and cannot be revealed by the roentgen ray. We must often rely solely on physical symptoms when the film fails to give the desired information. The examination of osseous structures radiographically may verify, modify or contradict the clinical evidence, thereby becoming a decisive diagnostic factor. Therefore, the importance of clear, properly made radiograms without distortion must be stressed. Many so-called full mouth radiographic examinations are worse than worthless as they are so very misleading, the angles are so poor and the images so badly distorted that they have the appearance of having been "shot on the wing." Perversion of dentition is more important than is commonly believed. Radiograms should be more extensively used in cases of delayed dentition. Several cases of supernumerary teeth interfering with the eruption of permanent ones have come under my observation in recent months. Observations of the third molars should be made to determine whether or not they are producing pressure which is causing irregularities. If impactions are discovered at an early age and corrected either by operative or orthodontic procedure, much harm can be averted. I agree with Dr. Simpson that all pulp stones revealed by the roentgen ray are not causing pain or inconvenience to the patient, but some are; therefore, the importance of ever being ready to check such pulp changes as being of possible diagnostic importance. Two cases have come under my observation during the past three weeks: in one, there was pain in the right ear due to pulp stone in the lower right second molar; in the other, pain in the right antrum with pulp stone in the upper right first molar. These are the only cases of neuralgia to be traced directly to pulp stones in several months, but they emphasize the importance of being always on the alert for any possible cause of symptoms. While it has been Dr. Simpson's experience that more cases of reflex neurotic symptoms are due to impacted third molars than to cuspids it has been my observation that impacted maxillary cuspids are responsible for reflex pains particularly in the maxillary molar region, owing to pressure on the nasopalatine nerves. A right cuspid may impinge on the left nasopalatine nerve, thereby causing pain on the opposite side, or visa versa. Patients have been observed who have complained of pain in the molar region and have had the molars removed without results, and later the removal of the impacted cuspids gave relief. I heartily agree with Dr. Simpson that extensive curettage should not be resorted to in acute cases; and, in chronic cases, where extensive curettage would cause considerable mutilation of the osseous tissues, it is better to resort to drainage—I am speaking now of extensively rarefied areas. It is my opinion, however, that the average periodontoma or cyst should be removed in its entirety at the time of operation, with as little destruction of the osseous structures as possible. It is rarely necessary to destroy enough alveolus in these cases to produce a deformity. It should be remembered that oftentimes extensive destruction of bone occurs before the patient presents for operation, and the surgeon is not to blame for deformity. Dr. Simpson's statements regarding the leaving of broken root tips is entirely correct and well stated. It is very desirable to make postoperative radiographic examinations, but rare indeed is the clientele which is educated up to this point of perfection, and I am of the opinion that if the periodontoma is removed in its entirety, there will be no recurrence, especially if it is an enlargement of the periodontal membrane. It is illogical to believe that it will recur if the substance from which it was formed has been removed. I do not believe that the extensive destruction of the osseous structures is necessary or advisable. The root apex which has reached the necrotic stage, where it becomes necessary to amputate it for the safety of the patient's well-being, would

probably better be amputated through the root socket. Dr. Simpson has given us a clear conception as to how pyorrhea should be treated and has shown conclusively that he knows how it should be done even though he does not follow it as a specialty. But I for one am disappointed that he did not tell us how far we could go radiographically in diagnosing the different stages of pyorrhea. The thought running through the paper is conservatism, and I believe that many of the so-called radicals of a few years ago are now becoming conservatively balanced.

H. S. Dunning, New York City: Coming from the surgical side of the situation, I should like to ask Dr. Simpson how any radiographer or how any radiogram can possibly tell a surgeon what he is going to do. I have been asked many times to look at a radiogram and to make a diagnosis. A radiogram or a roentgen ray as a means of making a diagnosis are like eight other factors, blood count, temperature, age of patient, other diseases, resistance of patient and other things; and, invariably, I have said, "This picture appears to be such and such, this condition appears to be such and such." But I doubt that there is a man in this room or any radiographer who can tell you exactly what the condition is and what a surgeon can do. It makes me very warm under the collar to get a radiographic record advising me what to do. I don't think it is ever done in the best of hospitals. If the surgeon is not able to decide what he is going to do when he gets the blood count, Wassermann reaction and radiographic report, at the time of operation, he very soon knows when he gets into the operation. Many surgeons have to change their mode of operating three seconds after they have made the incision. I don't see how Dr. Simpson knows when an abscess should be curetted, when a tooth should be taken out, when he does not know the condition of the circulation, the resistance of the patient or the age, or whether the patient is suffering from some other systemic disease. I don't see how he could make these statements, and I should like to have him tell us. If we can do that, it will be a great help to us. I believe that Dr. Simpson is right in that there is too much surgery being done, but I think the diagnosis must be made correctly, and then the surgeon would have to be trained to meet this proper diagnosis by proper surgical interference. I don't see how it could be done by the radiogram alone.

Theodore Blum, New York City: After listening to Dr. Simpson, some of us may have forgotten that he is a roentgenologist, first of all, had it not been for the most excellent radiography which he showed us on the screen. But I do believe, aside from this, his oral surgical sense is most remarkable, speaking generally, especially for a practitioner who specializes in his branch of the work. I call Dr. Simpson a roentgenologist, because I disagree with him when he speaks of radiology and radiologists, and I disagree with him because he, in his paper, says that the principles of oral surgery must be subject to those of general surgery, the parallel being that the principles of dental roentgenology must be subject to the principles of general roentgenology, and I believe that the body of general roentgenologists of America is superior to the body of dental roentgenologists of America, and that they have decided before the body of dental roentgenologists did that roentgenology is the term to be applied to the subject. It doesn't make any difference to me, but when it comes to the decision as to what it should be termed, I believe it should be roentgenology, roentgenogram and so forth. Regarding malposed teeth, I am very glad that the nomenclature which I have tried to establish has been accepted by some of the speakers. I would say that a malposed tooth should be put into normal position or removed. This should be a general principle in our work. Pain may come from any malposed tooth, whether in the upper or the lower jaw, but pain comes more frequently from the mandibular third molar than from any other malposed teeth. A case of a malposed canine in the maxilla was brought to my attention last winter. I was asked by the attending dentist and physician to remove this tooth. The patient was very ill, and I felt that the tooth had nothing to do with the condition. I mention this because the patient died the next day from a cerebral condition, which had caused the pain in the supraorbital region. Not only must pain call our attention to the cause of irritation but also numbness. I refer to this because in one case it was the first symptom of a carcinoma of the mandible which was secondary to a carcinoma of the colon. The first symptom of that case was numbness in the lip on the side affected. I believe with Dr. Simpson in periodic roent-

gen ray examinations of all patients, and I also believe if that patient comes in for an examination on account of pain we should not stop at examining this particular region, but should make a complete mouth examination, including at least four extraoral roentgenograms of the mandible and maxilla. To a large degree, I agree also with Dr. Simpson regarding curettage, but when he mentioned the fact that a tooth should not be extracted during the acute stage. I felt it should not be put in exactly these words. A tooth, during the acute stage, doesn't have to be extracted if you get sufficient drainage by incising a periosteal abscess, or in some other way. His suggestion as to postoperative extractions is a good one, and it is too bad at times that the advice we have to give our patients also brings us financial gain, which is naturally misinterpreted on that account by the patient. I am of the same opinion as Dr. Simpson regarding root amputation. I believe that it is one of the best operations in the field of mouth surgery. If we believe in root canal fillings, we can't help believing also in root amputation, which is nothing but a form of root canal therapy, plus root amputation. We must select the cases suitable for this operation, and we must also employ the proper technic. A third molar in the mandible was shown on the screen and later discussed, first, as showing the beginning of a follicular cyst and then Nasmyth's membrane. Nasmyth's membrane cannot be seen on the roentgenogram for the simple reason that it is of microscopic appearance and is very intimately associated and connected with the surface of the enamel. The shadow which we see occasionally over the crown of a tooth is part of the enamel organ and part of the whole dental follicle, and it is from the degeneration of this enamel organ or enamel follicle that the follicular cyst arises.

Dr. Simpson (*closing*): It was recognized that these were controversial questions in presenting them, and I believe careful reading of the paper will leave no doubt as to the views that I wish to express. I leave them for your consideration. I had no hope of standardizing radiographic indications and contraindications by this paper, but merely to promote that classification as a more definite indication for surgical intervention.

AN EXPERIMENT IN EDUCATION

By NEWTON G. THOMAS, M.A., D.D.S., Chicago, Illinois

THE title of these comments is scarcely defensible in theory but it is in fact. No person of culture regards education as an experiment today but rather as a many-sided utility essential to modern life, public and personal. When the first advocates of generalized learning proclaimed the rights and privileges and possibilities of education it might have been justly regarded as an experiment—and a dangerous one. Knowledge has always threatened ignorance, bigotry, and authority, and those endangered by the threat logically enough have barricaded its way. Today the freedom and fearlessness of learning is the boast of the schooled and frequently of the unschooled. The place of education in modern life is viewed as is nourishment or sleep. In general, the school in any interpretation is by no means an experiment, although it might be the constant subject of experiment.

Nor is education in itself regarded as experimental when it specializes in the service of a profession. The man of professional aspirations must be educated. He must know the lore, possess the history, understand the elements of

his calling, be able to correlate them. They must be grained into his thinking until his mind follows them with ease and his judgment in their application becomes trustworthy. If some special manual skill forms part of the equipment for service, that, too, must be acquired. The man must be educated. With the years subjects are expanded until what required only lectures now requires laboratories, and out of old subjects new ones spring or mayhap a course of study grows out of some savant's special discoveries. So the school years are lengthened or the number of them increased. The length of the year or the number of years may be debated but the question as to whether the man must be educated is not discussed.

The next step in the evolution of professional preparation is the fitting of the applicant to understand the principles and application of the sciences he must undertake in the specialized curriculum. When the medical laboratories got beyond the grasp of the high school product, the would-be medical registrant was compelled to increase his preliminary knowledge. This was not an option submitted to his choice, but an exaction. Is physics needed, or chemistry, or language? He must possess them. The servant is not greater than his lord and in this case the lord is medical service and human need. There is no room for debate; the man who would assume the responsibility for health and life must be educated.

The experimental phase of education affecting dentistry relates to economics. Growing out of many circumstances the sense of the need of education developed in the minds of dental leaders as before it had done in kindred fields. The laboratory method of teaching, the expansion of the sciences, the gradual erasure of the line 'twixt the mouth and the man, the need for cooperation between medicine and dentistry, the place of biology and chemistry in general education—all have combined to demand a higher fitness of the men who would aspire to dental registration. Forsooth the man must be educated. The economic phase appeared here. And here the schism appeared resulting in the present confusion of standards for admission to our colleges.

Three arguments have been presented to delay the establishment of the higher requirements. They have been presented in order somewhat as appended. The learning required will reduce the enrollment and that means a lowered output which again means a shortage of service. Associated with this, a sort of corollary as it were, was the fear that such a cry for dental service would arise from the suffering public that legislators would instigate investigations which would be disastrous. The timeliness, then, of the new demand for greater fitness to carry the sciences related to dentistry introduces the experimental element. The premise that dental practitioners should be educated remains undiscussed.

Another economic phase has been presented in the most serious gatherings of dental educators. It pertains to the time length that a youth is kept nonproductive and therefore dependent much on the state while at the same time the state awaits his service. It is asserted that every student owes the state that educates him a just return for the education it gives—a return difficult of estimate, to say the least. Then, too, the subtraction of so many years from the life of the student must be considered in the light of his own interest. The utilitarian turn of modern life will some day demand an accounting. Can dentistry justify its demands?

The fortunate possessors of nonspecialized education speak of another item. Suppose that a youth begins his medical, dental or legal training in the last year of his high school, increases the ingredient in his first year of college and so on until he is graduated from his chosen

school two or three years sooner than is now possible. Will the product justify the experiment? Will the gain in technical knowledge and skill, the early return of the youth to production justify the loss of cultural values that youth and state obtain from a fuller training in the humanities? Scientific laboratories are not yet conducive to the development of the finer hues that have in days past been so largely the gift of university training. Except in rare instances, the man condemned to the intensified professional program indicated above would be condemned to a cell without much mental "out doors" to enjoy. In the last analysis, education does not give culture. Culture begins before education. Predisposition and home nurture figure largely in its development, but sometimes predisposition has no exciting cause in the home and the predisposition must await some other stimulus. What literature and history and philosophy and cultured scholars contribute to life is worth a little consideration. The men who ponder this issue doubt that the state or the individual can well brook the loss that accompanies the intensified program of special training. Such economics concern life in a fuller sense than the ledger. So experimentation began.

Among dental educators were some who urged the need of more extended and intensive preparation for the science program of the dental course as taught in their schools, and took steps to require such preparation of the registrants to their curriculums. Others were not convinced that the time had come for such a measure and argued as indicated above, giving added point to their argument by saying that the profession and the public should be prepared for such a move. The result was and still is that approximately one-half of the schools demand a year of college with more or less clearly defined subject-matter exactions, while the remainder admit on a high school preparation. At a very near date other schools will append a year of college to their requirements. Two pertinent questions come to mind, namely, Has the delay to establish uniform requirements had the desired result of preparing the profession and the public, and, How much better might a unanimous move on the part of the schools have met every need and argument made by those who delayed?

First-hand evidence of the experiment in practice is given at the registrar's desk. There our educational status appears in clear lines. An intelligent youth comes up to discuss his entrance. If he has subject credits to admit him to a school of higher requirements, he may be expected to enter without question. If he lacks credits for such a school, he will enter when admission is possible. Should he have credits sufficient for one and funds afford a question, he settles the question not on the ground of school value but on a money basis. His reasoning is quite sound. If the profession cannot agree on its own terms of admission, he has no responsibility in the matter; if training in the sciences is not necessary and schools of lower entrance standards can prepare men for the boards of admission, why should he undertake the toil of an added year? His two deterrents are finances and entrance credits. He cuts the Gordian knot effectively and begins the journey toward his chosen vocation.

For such an entrant no explanations can be given for such a medley of requirements without embarrassment to the giver. Nor is a clear, understandable explanation possible. The profession is divided on a vital issue. A mere spectator would suspect that it scarcely knows what it wants. The question that remains unanswered is: Does a man need more than a high school education to become such a dentist as in these days the profession approves? Here and there is an emphatic affirmative; here and there is an uncertain negative; here and there is evident agnosticism. All of this is a pain of growth, for growth there

has been, growth despite the dissension, growth steady and healthy. Classes in the most rigorous of the schools have increased with each year; the protagonists of higher education have been approved. Parents sigh when children insist upon the inculcations of experience, but experience is ever the desire of youth. With a definite example before us we have chosen pain with growth as does youth, pain when it might have been avoided. The prospective student proves that the preparatory value of the delayed advance in requirements for profession and public has been only weakly effective. What definite co-operation on the issue might have meant on the issue awaits demonstration.

It seems beyond doubt that the profession must asseverate its own evaluation, its own needs, its own requirements, and convince the world of the same by its contributions. The uncertainty of tone in our announcement of academic exactions puts a quaver in our claim to eminence in health service. The public cannot be convinced by the divided standards now prevailing that we take ourselves seriously, and certainly kindred professional institutions look askance at our academic confusion.

Perhaps the greatest indictment that can be preferred against us is that these variable standards indicate a low appreciation of university service. A limited study of university history discloses a recent shift in objectives, to-wit, from an almost exclusively personal consideration to the belief that a university must serve a large constituency, must serve life in its broadest dimensions. The student cannot be the primary interest but the public must ever be. The university serves man rather than the man. It conceives its function to be the discovery of new truth, truth that ministers to life.

The objects of education have been given as decorative, marketable and creative. It is easy to determine the most important. To ornament a social unit or put into his hands the possibility of a greater personal service or a greater competence cannot be classed with the later concept of university education. Dental education, then, must meet the standards of its kindred schools or default its claim. It must prepare men to search for truth in its many hiding places and put it at the service of human need. Since no prescience can tell where a discoverer may be in the student ranks, it is plain that the training must be uniform for all.

Gradually the educational ascent is being made. One by one institutions are coming to the superior standards. Public approval of a more efficient service is shown by an increased enrollment in the college of higher demands. It is to be hoped that soon there will be a parity of entrance requirements among colleges and a better parity among college products, with a consequent interest in the fundamentals of human health and disease.

AN UNUSUAL PROSTHETIC RESTORATION

By WILBUR A. CLEMENTS, D.D.S., Memphis, Tennessee

History.—Mrs. N, aged 52, who came in for prosthetic service, gave a history of operation for removal of cancer in the nose performed twelve years previously. Her general health was good.

Examination.—The external nose, both osseous and cartilaginous parts, was entirely gone, leaving a pear-shaped opening in the face extending from the radix nasi to the nasal spine and laterally to the elevation of the internal orbital ridges, the borders of which were very hard scar tissue. Examination of the internal nose revealed that the cavum nasi was indeed a cavity, whose lateral walls were made up of the maxillary and ethmoid bones, the floor by the hard palate and the roof by the cribriform plate of the ethmoid. The inferior, middle, and superior chonchae had been removed from the lateral walls, the opening into the maxillary sinus as well as the outlets from the other accessory nasal cavities being thus revealed. A portion of the soft palate had been removed also, so that the posterior nares were really a single opening large enough for the tongue to enter the nasal cavity and play above the hard palate. The choana, a single opening, extended from the posterior wall of the pharynx to the rear border of the hard palate. A very thin layer of soft tissue remained on its posterior edge.

The opening from the nasal into the oral portion of the pharynx was wide and unguarded; and the absence of the soft palate, uvula, and the muscles of the soft palate rendered the closing of the nasal cavity in the act of swallowing impossible, allowing food, and especially fluids, to pass into the nasal cavity. The teeth had all been lost.

Figure 2 shows the extent and location of the opening through the soft palate. Speech was very much impaired and patient was too sensitive about her condition to appear in public.

Treatment.—Full dentures were built, the upper carrying an obturator that closed the cleft except for the small openings for breathing. An impression of the face was made, also an impression of the nasal region of the face of a female relative of the patient. A nose was carved in wax and fitted to the cast of the face of the patient and then reproduced in cast aluminum, which was tinted by an artist to approximate the shade of the skin.

A small hook was cast in the artificial nose at a point level with the eyes on the surface extending back in the nasal cavity, a similar hook having been

Fig. 1.—Left: Appearance of patient when first seen. Right: Appearance with appliance in place.

Fig. 2.—Model showing extent and location of opening through the soft palate.

vulcanized in the obturator just posterior to the border of the hard palate and on the surface extending into the nasal cavity. A small rubber band is used over the hooks to hold the nose in place, its stability being also aided by glasses that rest on the appliance.

A small amount of actor's putty is used to blend the border with the tissues and, with the aid of a few cosmetics, her appearance is such that the patient goes out in public without embarrassment. (Fig. 1, right.) She is able to converse successfully with anyone, her speech being much improved, although not normal.

EXPERIMENTAL STUDY IN SALIVARY REACTION*

By L. R. GANS, D.D.S., New Haven, Connecticut

(Clinic given before Connecticut State Dental Association, May 1, 1925)

IT WAS the practice for a long time to consider that various abnormal conditions of the teeth and soft tissues of the oral cavity were caused by or were associated with the presence of acid in the mouth. In recent years, this view has been challenged repeatedly. Because of the important functions which saliva fulfils in the mouth, its reaction may deservedly be studied carefully.

In reviewing the literature relative to experimentation and work done on salivary reaction and associated influences, such works as the following, together with the numerous and exhaustive studies of saliva by Gies, Kirk, Pickerill, Howe, Nielson, Carlson and many others, were read and studied for indicators of salivary reaction.

Prinz (1918): "Relationship of Oral Secretions and Dental Caries."

Marshall (1917): "Composition of Saliva in Relation to the Incident of Dental Caries."

Ferris (1919): "Mouth Hygiene Controlled by Diet Through Salivary Analysis."

Graham (1919): "Litmus as an Indicator of Salivary Reaction."

Myers (1918): "Salivary Analysis."

Bloomfield and Huck (1920): "Reaction of Saliva."

Brown and Freeman (1916): "The Effect of Variations of the Gastric Secretions upon the Composition of Saliva."

Barnes (1907): "The Bactericidal Action of Saliva."

Stern (1904): "Changes in the Salivary Secretion Affected by Systemic Diseases."

The present paper was undertaken with the thought in mind of an investigation to determine the true acidity of saliva as distinguished from so-called acidity as measured by the usual titration procedure and the uses of various indicators.

Some investigators have reported that saliva is commonly or normally acid, and others that it is alkaline in reaction. As long ago as 1911, Howe[1] drew attention to these conflicting statements in the earlier literature, and he especially pointed out the importance of using the appropriate indicators in measuring the acidity of saliva. In general, he found that "if the majority of text books speak the truth, then acidity is the divergent step from normal and its degree is the index of the underlying physiological alteration." Since then, numerous investigations and studies have proved that

*Experimental Work Conducted at the Brady Laboratory, Yale University.

1. Howe, P. R.: Indicators in Salivary Analyses, Dent. Cosmos, 53: 320 (March) 1911.

the conclusions of these earlier workers were not entirely correct.

In the past ten years, the methods of measuring hydrogen-ion concentration, resulting in determining the true acidity of the substance examined, have been perfected. We have, therefore, considered it important to undertake a study of the hydrogen-ion concentration of saliva in normal mouths and in the mouths of persons showing carious teeth, gingivitis, pyorrhea and other pathologic conditions, as will be noted from the accompanying table.

No effort of any degree was exerted in obtaining the saliva, any procedure as used in the works of nerve stimulation and inhibition as done by Heidenhain and Langley or psychic stimuli by Pawlow, being eliminated, nor was the saliva dialyzed, to avoid the loss of carbondioxid and an increase in p_H.[2]

The measurements of the acidity of saliva were conducted colorimetrically. In general, the procedure was as follows: A sample of fresh saliva was collected in a clean test tube. One half of the collected saliva was placed into a second tube, and promptly after diluted with approximately 4 parts of distilled water and the mixture stirred. The diluted saliva was then distributed into five clean tubes. The other half was filtered through filter paper, the filtrate being then subdivided in two, one-half distributed in five clean tubes and the other half boiled and distributed in five clean tubes. The unfiltered and filtered, and the filtered boiled preparations were then tested with: (a) litmus, (b) phenolphthalein, (c) congo red, (d) lacmoid and (e), colorimetrically, with bromthymol blue.

2. The p_H is the Sorenson index of true acidity. The smaller the p_H, the higher the acidity; and the greater the p_H, the lower the acidity or the greater the alkalinity.

Bromthymol blue is that indicator in the Clark and Lubs series which is appropriate for the measurements of hydrogen-ion concentration (or true acidity) in the zone of reaction within which saliva usually falls. The theory and technic of measuring true acidity are given at length by Clark.[3]

In the colorimetric examination, the following procedure was employed:

Bromthymol blue, 1 c. c., was used rather than the drop method, as giving accuracy in the amount used each time for each test. The saliva was diluted in the ratio 1: 9 with distilled water, which is exactly the same dilution employed by Starr and Bloomfield and Huck.[4]

Such quantities of saliva were collected and transferred by means of a pipet to five test tubes containing such amounts of diluted water as to render the proportion of saliva to water, successively, 1 part saliva to 10 parts water. Then 0.01 per cent bromthymol blue was added so that the indicator was always present in the proportion of 1:10 with respect to the total quantity of diluted saliva.

Preliminary to using any of the foregoing apparatus, such as test tubes, pipet, and funnels, in the investigation, they were washed and rinsed thoroughly in freshly boiled distilled water. The color reactions in each tube were then carefully noted, and matched exactly in color the standard buffer solution, ranging in p_H from 6.2 to 7.6. Each sample was tested, heated and unheated, to determine whether the measured acidity was influenced or determined by the con-

3. Clark: The Determination of Hydrogen-Ion, 1922.

4. Bloomfield, A. L., and Huck, J. G.: Bull. Johns Hopkins Hosp. 31: 118 (April) 1920.

HYDROGEN-ION CONCENTRATION IN NORMAL AND PATHOLOGIC ORAL CONDITIONS

Age	Extractions	Normal Gums	Pyorrhea	Gingivitis	Small Amount of Bridgework	Extensive Bridgework	Extensive Caries	Sex	Edentulous Mouths	Partial Plates	Devitalized Teeth	P_H
21		1						F				6.7
28				1			1	M			4	6.9
26				1	1		1	M			3	6.6
35			1		1			F			2	6.6
45				1		1		M				6.7
25		1			1			M				6.4
28	12			1		1		M				6.4
27				1				F				6.4
32	1					1		M				6.4
13	1							F			2	6.4
35	1			1				F	1			6.4
22	2			1	1			M				6.8
56	12			1				M				6.6
35	1	1		1				F		1		6.0
50	1							F	1			6.1
28	4			1				F			8	6.6
16	3	1						M			1	6.4
15	4	1						M				6.4
38	9	1			1			F	1			5.9
50	6	1			1			F			1	6.6
24	2	1				1		F				6.4
35	14				1		1	F			2	6.7
50	4	1		1			1	M			1	6.6
32								M			1	6.4
48		1	1			1		F			1	6.4
17	1	1				1		M	1	1		6.3
28	8				1		1	F			1	6.2
28	20						1	M		2		6.4
40	14			1			1	F			3	6.6
50			1				1	M				6.5
28		1						F	1	1		6.6
55	4		1		1		1	M		1	1	6.4
50			1					F	1	1		6.4
29	4	1					1	M		1		6.4
35‡		1						M			1	6.8
27	4	1						F				6.5
42				1				F				6.8
24		1						F			1	6.6
34	15			1				M			3	6.6
20		1						F			3	6.5
23		1			1			M			4	6.4
50	12			1				F				6.6
70		1			1			F				6.8
18		1					1	F		2	2	7.0
25	1	1					1	F				6.9
23	1	1					1	M			3	6.6
20		1					1	M			4	6.8
29		1			1		1	F				7.0
18		1						M			1	6.4
28		1					1	F	1		3	6.5
21		1						M				6.8
11		1						M		1	3	6.5
24		1					1	F				6.8
30	4	1						M				6.8
35		1						M				6.5
40	8	1					1	M	1			6.6
16		1						F				6.6
10	3	1						F				6.4
45	2			1				F	1			6.6
37	5	1					1	M				6.6
16	3	1						M				6.4
20		1						F				7.0
52	8	1						M		11		6.4
55		1						F				6.5
62				1			1	F				6.4
35	2			1	1		1	M				6.8
22	2	1					1	F				6.8
22		1					1	M				6.6
13		1						M				6.6
45		1						M				6.6
16*		1				1		M				6.6
16		1						M				6.6
50		1					1	F				6.8
21*				1		1		F				6.6
22		1						F				6.8
17		1					1	M				6.8
27		1					1	F				6.6
32		1					1	M				6.4
37*		1					1	M				6.8
40			1	1				F	1			6.6

*Small amount of caries. ‡Vegetarian.

centration of the carbonic acid gas which is a normal constituent of saliva. Heating the saliva drives off the carbonic acid gas, and should, if anything, decrease the acidity.

We have examined about ninety samples of saliva obtained from persons of all ages and both sexes without a purposive selection through a period of about six months. They represent samples of saliva as one would obtain it at random from the clientele of the usual dental practice, including persons who showed evidences of the conditions listed in the accompanying table.

It is unnecessary to report all of the experiments in detail. In all cases, the saliva, fresh, filtered and filtered boiled, was neutral or slightly acid to litmus, colorless to phenolphthalein, red to congo red and blue to lachmoid. No differences between the filtered and unfiltered, boiled and unboiled preparations were evident, which indicates the relative unimportance of the carbon dioxid concentration. The results with these indicators show the samples of diluted saliva to be in the zone of acidity which is represented by the range of p_H 6.4-7-0 inclusive.

Our results with bromthymol blue are in complete accord with the degrees of acidity suggested by the other indicators. The result is accurate not only in giving the reaction of the saliva (acid or alkaline) but also in giving the degree of acidity or alkalinity. The results are summarized in the table where the p_H of the saliva is indicated according to the condition of the teeth and gums.

The table conclusively shows the magnitude of the field covered in pyorrheic mouths containing all variaties of dental constructions. The various metals used in restoration, such as amalgam, alloys, synthetics, gold and solders, were taken into consideration in the determination of the final hydrogen-ion concentration. Included also in the consideration of change in hydrogen-ion concentration were food ingestions, mouth washes and toothpastes.

It is evident from the data collected in this investigation that:

1. Saliva is nominally slightly acid (p_H 6.4 to 7.0).
2. The normal acidity of saliva is independent of the condition of the teeth and gums.
3. The acidity shows no constant relation to the occurrence of abnormalities in the mouth.

I am greatly indebted for the outline of this work and the valuable assistance in conducting these experiments to Prof. C. Underhill of the Physiological Laboratory of Yale University.

THE PORCELAIN JACKET CROWN

ITS USEFULNESS IN REMOVABLE BRIDGEWORK

By CARLISLE C. BASTIAN, D.D.S., New York City

(Read before the American Dental Association, Louisville, Ky., Sept. 22, 1925)

THE porcelain jacket crown has rendered wonderful service in raising the status of our profession. When indicated, it makes a restoration that is almost lifelike in appearance, comfort, durability and compatibility with the adjoining and underlying living tissues. In many of these respects, it affords a striking contrast to the old-fashioned gold shell crown.

To follow the first of the two possible methods of construction, the indirect, we first prepare the tooth in the mouth and reproduce with an amalgam die. Plaster models are made, and the crown is constructed to fit exactly the amalgam die and to conform with the plaster models. To follow the direct method, we would make the crown on the prepared tooth in the mouth without the aid of the amalgam die and plaster models. The indirect technic is recommended because it offers uniformly better results.

There are two types of the all-porcelain jacket, one known as the shoulder crown, the other the shoulderless, or, as it is sometimes called, the overlap crown. With the shoulder crown, the shoulder is cut around the neck of the tooth just below the free gum-margin. This shoulder is made at right angles to the long axis of the tooth and of as little depth as possible. The jacket is made to finish flush with the outer margin of the shoulder and at the same time to restore the proper enamel contour at the gum margin. The shoulderless, or overlap, crown eliminates the cutting of a shoulder, the porcelain tapering down to a fine edge beneath the gum line.

The advantages of the shoulderless over the shoulder crown may be summarized as follows: (1) conservation of tooth structure; (2) lessening of the danger of subsequent pulp involvement; (3) reduction of pain in the preparation.

There are, however, some accompanying disadvantages: (1) the impossibility of getting a perfect fit at the gum margin; (2) the danger of fracture of the porcelain; (3) the difficulty of getting the correct anatomic restoration at the gingival third.

Taking a common clinical case, that of a lower bicuspid with a gold shell crown, we frequently notice that the gum margin has receded. After the removal of the gold crown, we usually find that the enamel has been destroyed; the tooth is free of the bite, and there may be decay or sensitiveness around the neck of the tooth. From an esthetic

standpoint, a porcelain restoration is usually now desirable.

If the distance from the gum margin to the occlusal surface is considerable, and the coronal portion of the pulp shows little recession, there is grave question whether the necessary tooth structure should be sacrificed in order to cut a shoulder for a porcelain jacket shoulder crown. In order to cut even a small shoulder and then extend a preparation in conical form to the occlusal surface, a relatively large amount of sensitive tooth structure would have to be sacrificed. With the shoulderless preparation, we remove much less tooth tissue.

The question of subsequent pulp devitalization is one of the points in dentistry frequently discussed but never quite clearly settled. Generally speaking, with any restoration of tooth structure, the greater the amount of sound dentin covering any vital pulp, the less the danger of subsequent pulp trouble.

From the discomfort of the patient, I have noted that a tooth could be prepared with little or no pain up to the point where the enamel was removed and the preparation made approaching the form of a cone. The cutting of the shoulder, especially with a contra-angled handpiece, becomes so painful that procain must usually be employed.

In considering the disadvantages of a shoulderless crown, we first have the difficulty of getting a perfect fit at the gum margin. With the shoulder crown, there is a definite finishing point. The crown with the platinum matrix, *in situ*, is made flush with the surface of the shoulder on the amalgam die; and when it is placed on the prepared tooth in the mouth, the fit can be verified by the aid of a delicate explorer. The platinum matrix having been removed, the crown settles uniformly for the thickness of the platinum. That the thickness of the matrix makes a material difference is shown in constructing an anterior

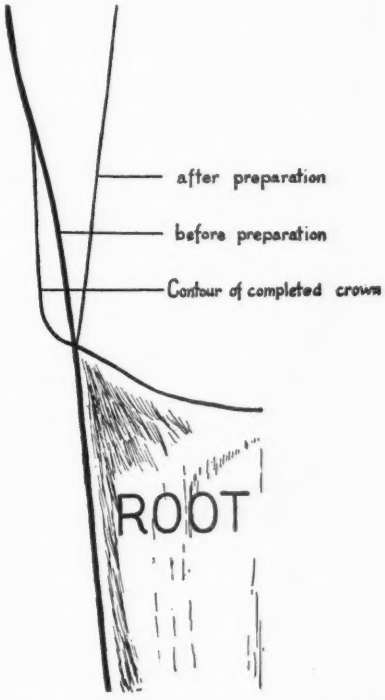


Fig. 1.—Excessive contour frequently found at gingival third of all porcelain jacket shoulderless crown.

crown for an edge-to-edge bite. If the bite is correct before stripping the matrix, the crown will be free of the bite after removal of the matrix.

With the overlap crown, it is difficult to verify the fit, especially for posterior teeth. There is an overlapping edge of porcelain all around, and the misfit must be appreciable in order to

be apparent. When the matrix is removed, the shoulderless crown may not settle perfectly like a shoulder crown, and may not fit so well as with the matrix in position; that is to say, the crown may rest on one or more small surfaces beneath the gingival, and the remaining margin of the crown stand away for the thickness of the platinum matrix. This point has a bearing on the danger of fracture of the porcelain. If the edge of the crown binds on one or two places, it is liable to break or chip away during cementation.

A formidable difficulty with a shoulderless crown is to secure the correct contour in the gingival region. With most preparations, we have removed a thin knife edge of tooth tissue beneath the free gum-margin. To replace exactly with porcelain is impossible, owing to the friable nature of the material. Hence, the crown is usually constructed with slightly exaggerated contour and a rounded edge. (Fig 1.) A condition found less frequently is shown in Figure 2. In such cases, the shoulderless restoration more nearly ap-

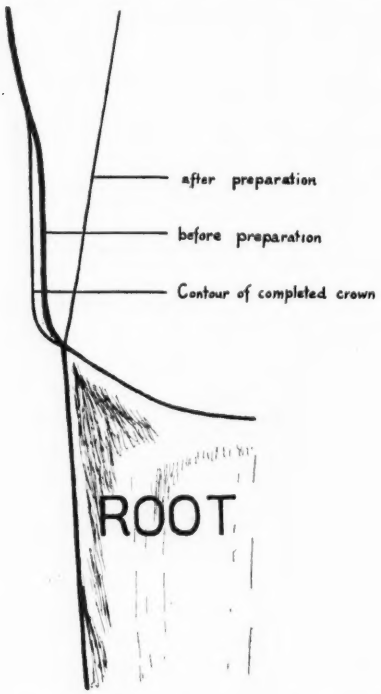


Fig. 2.—At times, the contour of a natural posterior tooth makes replacement possible with all porcelain jacket shoulderless crown.

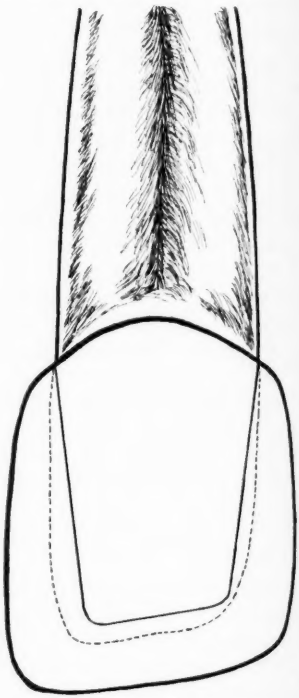


Fig. 3.—Peg lateral with all porcelain jacket shoulderless crown in position; light line, after preparation; dotted line, before preparation; heavy line, contour of completed crown.

proaches the normal. Figure 3 illustrates the condition of a peg lateral before and after preparation, and with the porcelain jacket in position. In this case, the necessarily exaggerated contour makes the shoulderless crown

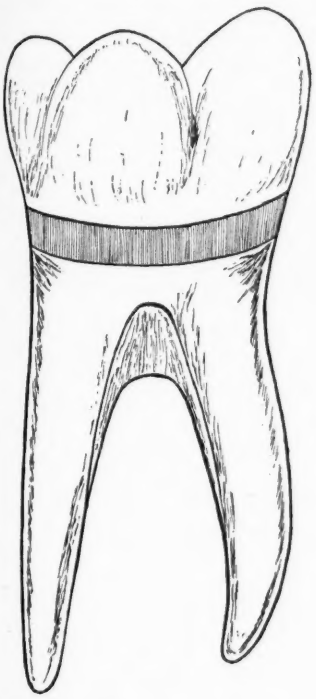


Fig. 4.—Porcelain jacket crown with metal shoulder at the gingival margin.

almost ideal. Broadly speaking, with shoulderless crown restorations, we find an excessive contour at and beneath the free gum margin. The gingival tissue tolerates the added tension created, but there will often be noted a lack of tonicity and a slight hypertrophy of this tissue.

The type of crown that I recommend is a combination of the porcelain jacket with a gold shoulder at the gingival. (Fig. 4.) This is applicable for those cases which demand a porcelain crown in the posterior part of the mouth, where the shoulder crown is contraindicated. This crown has the advantages of both the shoulder and shoulderless types, without their disadvantages. These features may be summarized as follows: (1) conservation of tooth structure; (2) reduction of the pain in preparation; (3) lessening of the danger of pulp trouble; (4) the possibility of getting a perfectly fitting inlay margin at the gingival, and any desired anatomic contour. The latter is practical on account of the adaptability and strength of a thin edge of gold. The platinum employed in the making of the gold shoulder remains as part of the crown, which should fit the tooth in the mouth as perfectly as it does the amalgam die. This fit can be verified before cementation, with the aid of the explorer.

The three disadvantages which might be mentioned are: (1) the substitution of gold for porcelain in contact with the free margin of the gum; (2) the danger of conduction, by the metal, of thermal changes to the pulp; (3) the unsightly appearance of the gold shoulder at the neck of the tooth.

Taking the first under consideration, it has been noted for years that the soft tissues of the gingival margin remain ideally healthy when in contact with highly glazed and properly contoured all-porcelain crowns. The correct contour of the porcelain protects the soft tissues during mastication, and places the necessary tension on the gingival tissues. The highly glazed porcelain does not afford lodgment to any foreign

particles, a possible chemical or mechanical irritant being thus eliminated. This is in marked contrast to the banded porcelain crown, in which the opposite conditions are noted: an irritating edge of a metal band, and a lack of contour of the gingival third of the crown. With the crown here suggested, the band is replaced by a platinum and gold shoulder, which fits like an inlay and can readily be given the proper contour. The gingival tissues are thus given the proper tension and protection during mastication. The comparative porosity of cast gold and baked porcelain is nearly equalized by correct casting technic, followed by polishing and burnishing.

The danger to the pulp from thermal changes is minimized by the fact that little tooth tissue is destroyed beneath the metal shoulder.

Fig. 5.—Lower bicuspid prepared for an all porcelain jacket shoulderless crown.

Fig. 6.—Impression of the prepared tooth in modeling compound employing a copper band.

The objection from an esthetic standpoint must be clearly acknowledged, and limits the use of this type of crown to posterior teeth. I make no attempt to conceal the entire metal shoulder beneath the free margin of the gum, but prefer to have the union between gold and porcelain just slightly

occlusal to the free margin of the gingiva on the buccal and lingual surfaces.

The questions of health of the gingival tissues and of thermal shocks to the pulp can best be answered clinically. I have employed a large number of these crowns for the past three years, with excellent results in both respects.

The other half of our problem is the construction of the porcelain jacket with the gold shoulder for vital teeth. The tooth is prepared as for the shoulderless crown. (Fig. 5.) Thus, all cavities are filled with cement, and all excess removed to about

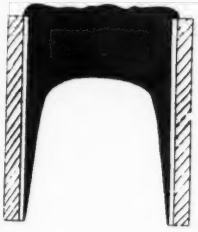


Fig. 7.—Impression of prepared tooth wrapped with casting wax to create artificial temporary shoulder.

1 mm. beneath the gum margin up to the occlusal surface. This may be accomplished by any technic desired, but let me emphasize the importance of not injuring the gingival tissue. A 36 gage seamless copper band is fitted accurately around the tooth, conforming to the gum festoon. This band is passed between the free gum margin and the prepared tooth to a depth of about 1 mm. It must fit accurately, so that it will not push back the gingival tissue, yet not too tightly because, in taking the impression, it is necessary to get a thin film of compound on the inside of the band. The band is trimmed to a little above the occlusal height of the preparation and filled with modeling compound, and an impression is taken of the tooth. (Fig. 6.) One point must be strictly borne in mind: the gingival margin of this impression should indicate the future gingival margin of the finished crown.

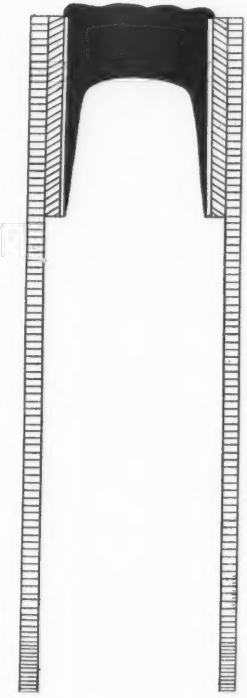


Fig. 8.—Another layer of wax is added before the impression is embedded in Spence's plaster.

A plaster, modeling compound or wax impression is taken of the prepared tooth and several teeth adjoining on each side. A wax bite is also necessary. A temporary covering is placed over the prepared tooth to protect it during the making of the crown.

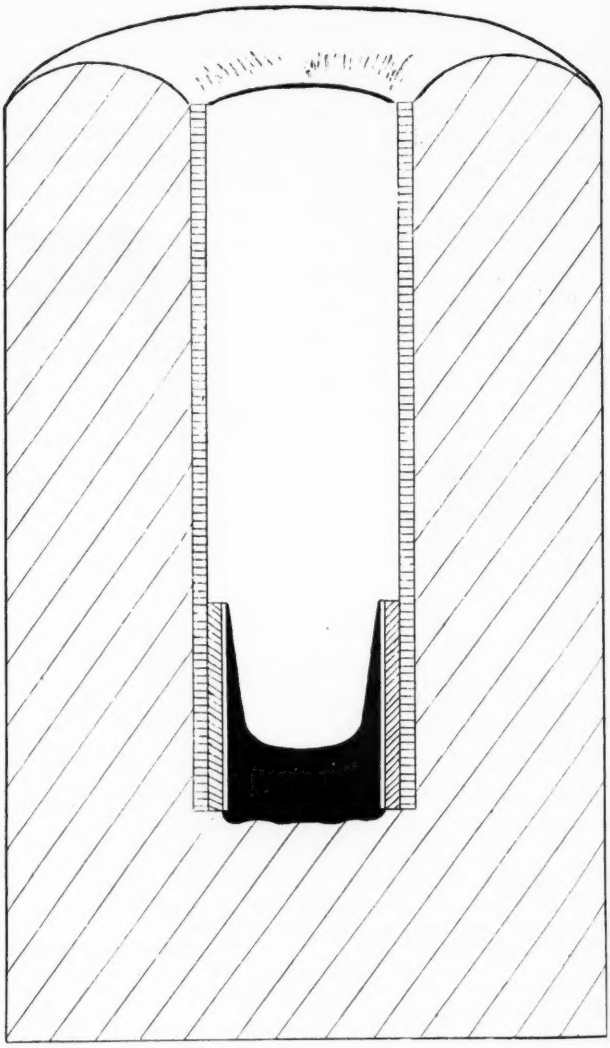


Fig. 9.—Cross section of the impression embedded in Spence's plaster ready to receive the amalgam.

The impression of the prepared tooth is wrapped with casting wax of, say, 28 gage. (Fig. 7.) Another layer of wax is wrapped around (Fig. 8), and the whole is next embedded in Spence's plaster (Fig. 9), which is allowed several hours to harden, after which the amalgam die

is packed. The die, after setting, is removed from the plaster, appearing as shown in Figure 10. It will be noticed that an amalgam shoulder was created on the die in packing the amalgam against the edge of the impression

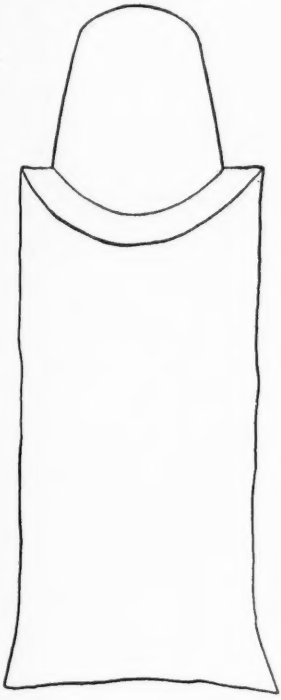


Fig. 10.—Amalgam die after removal from modeling compound impression and Spence's plaster.

and the casting wax around it. The die is prepared (Fig. 11), and mounted in the bite, and plaster casts are poured. Later, the die is mounted in the impression and the plaster cast poured.

The die is now ready to receive the metal shoulder. A strip of platinum, one one-thousandth inch thick, is wrapped around the shoulder on the die, extending 1 mm. below it and 3 mm. above it, and joined with a tinner's joint. (Fig. 12.) The platinum is burnished and swaged on the amalgam die.

Casting wax is placed uniformly on

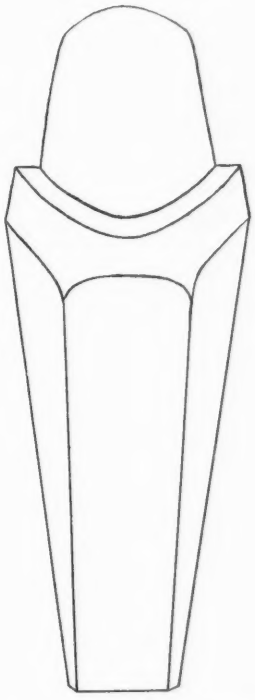


Fig. 11.—Amalgam die prepared for mounting in the bite and impression.

the platinum around the shoulder for the height of 1.5 mm., and as thick as the contour of the case demands. (Fig. 13.) The platinum and wax are removed from the amalgam die and cast in inlay gold. In casting, the gold should not burn through the platinum. It can then be placed in position on the amalgam die. (Fig. 13.) At times, it

may be necessary to tap it carefully with an orange-wood stick. This shoulder of metal becomes the shoulder for the porcelain jacket shoulder crown, which is now constructed thereon in the usual manner.

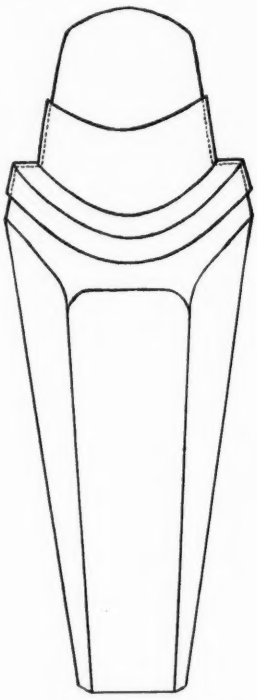


Fig. 12.—Platinum foil burnished and swaged on amalgam die to receive inlay wax for making metal shoulder at the gingival margin.

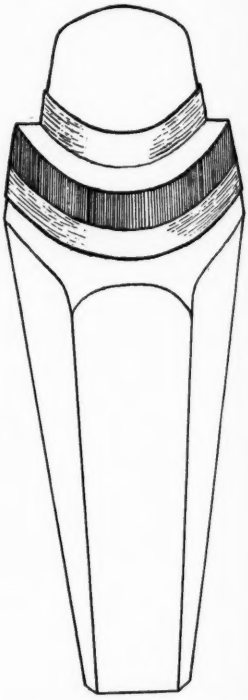


Fig. 13.—Casting wax added to platinum for making a metal shoulder at the gingival margin, which is then removed from the amalgam die, cast in inlay gold and replaced on the die.

After the porcelain jacket is brought to the final biscuit, the surplus platinum is trimmed away. The porcelain jacket should accurately fit the metal shoulder and the amalgam die. (Fig. 14.) The metal shoulder is trimmed away to the anatomic margin of the amalgam die and given the correct contour, as shown in Figure 15. The crown is now ready to be tried in the mouth. The porcelain is tested for occlusion, general anatomy and contact points, and the metal shoulder for fit and contour at the gingival. The jacket is glazed and the platinum stripped from the porcelain, and the crown is ready for cementation. (Fig. 16.) The porcelain jacket is filled with thinly mixed cement, and the metal shoulder is placed in position, and moved slightly up and down once or twice to ensure

the flowing of the cement between the metal and the porcelain. The cement is then smeared on the inside of the metal, and the porcelain and metal shoulder crown is gently and firmly forced to position.

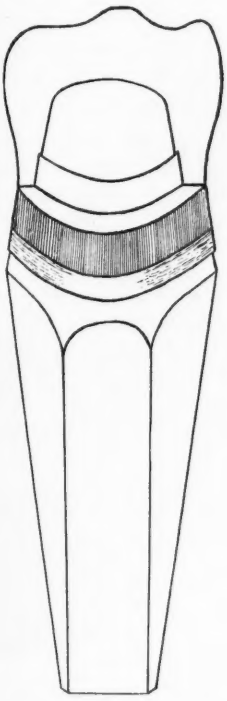


Fig. 14.—Biscuited porcelain jacket shoulder crown in place on the metal shoulder.

The porcelain jacket crown with a gold shoulder is admirably adapted in a limited number of cases to removable bridgework; for instance, on a lower bicuspid or molar where (1) the entire occlusal surface of gold would be unsightly; (2) it would be possible to secure sufficient occlusal thickness of porcelain to give the necessary strength, and (3) the bite is sufficiently open to allow the placing of a removable inlay attachment on the side of the tooth adjacent to the missing member.

Let us suppose that such a condition exists in the second bicuspid and second molar and that the intervening molar is missing. (Fig. 17.) The second bicuspid and second molar are prepared for shoulderless jacket crowns. (Fig. 18.) A porcelain crown with a metal shoulder as heretofore described is constructed for each, with the following modification: on the distal side

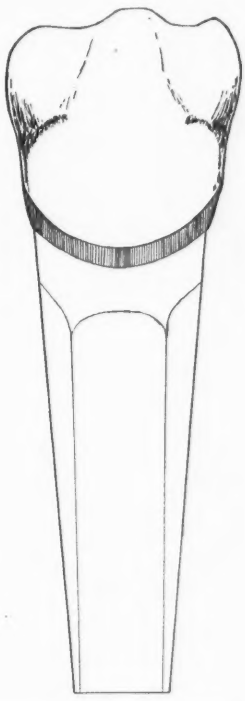


Fig. 15.—Metal shoulder trimmed away to anatomic margin of amalgam die and given correct contour.

of the bicuspid, the platinum, with a thin covering of gold, is extended sufficiently high up to cover the distal surface of the amalgam die. (Fig. 19.) The porcelain jacket, after completion, is then cut away on the distal surface to allow the placing of an inlay attachment. (Fig. 20.) For this purpose, I have been using a small, strong and

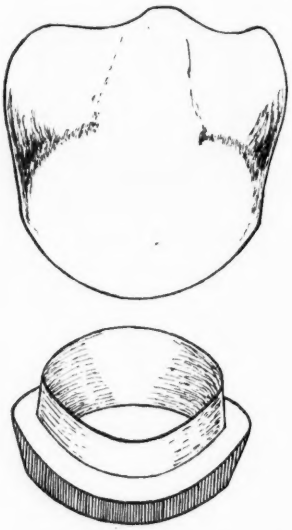


Fig. 16.—Porcelain jacket crown and metal shoulder ready for cementation.

readily adjustable attachment, such as the Gollubin.

In the construction of the jacket, it is most essential that, after the porcelain is ground away for the metal insert, there appear a sufficiently thick occlusal surface of porcelain. (Fig. 20.)

The second molar crown is similarly constructed except that the attachment has to be placed in the mesial part of the jacket. The two female portions of the attachments are paralleled (Fig. 21), waxed into place, removed from die and cast onto the platinum and gold. In this connection, we must carefully study the case so that we may have a broad, strong joint, reinforced with solder between the female casting

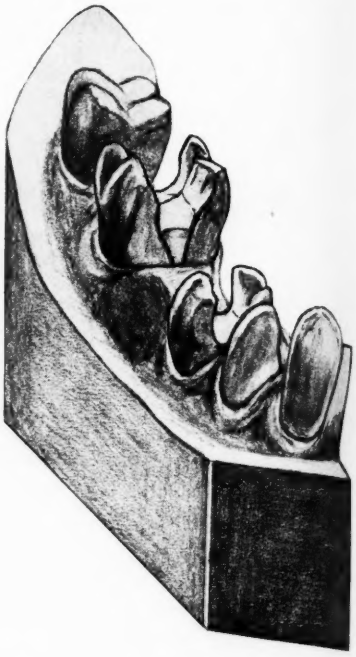


Fig. 17.—A suitable case for porcelain jacket crowns with removable inlay attachments.

and the original shoulder casting. The casting must accurately fit the porcelain jacket. The bridge is then completed according to removable bridge technic. (Fig. 22.)

The cementation of a bridge of this character is difficult. A thin mix of crown and bridge cement is made, and each crown gently cemented almost to

place. The bridge is set in position, and the two crowns and bridge are gently and firmly cemented, care being taken to keep the cement away from the inlay attachments. No attempt is made to remove the bridge until the next appointment. Emphasis is laid on the necessity of using thin cement on account of the glovelike fit secured by the metal shoulder around the gingival margins of the abutments.

The question sometimes arises as to whether it is advisable to use Bonwill

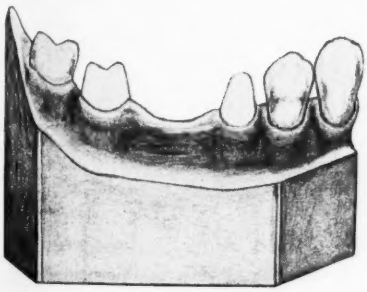


Fig. 18.—Second bicuspid and second molar prepared for porcelain jacket shoulderless crowns.

clasp bridges on porcelain jacket crowns. I have many times used Bonwill clasps on both the all-porcelain shoulder jacket and the combination porcelain jacket with the gold shoulder. However, in this regard, I must state that I use only the wrought or bent clasp and never the cast clasp. I find that these bridges have a large field of application. They are easily handled by the patient on account of the greater bulk afforded by the clasps in the case of a single missing tooth; also, they rarely need adjustment.

In making a Bonwill bridge, we construct jacket crowns in the ordinary manner, giving due consideration to the future parallels of the finished jackets. Sufficient space must be allowed for the occlusal rest, and the porcelain beneath this rest should be strong and flat.

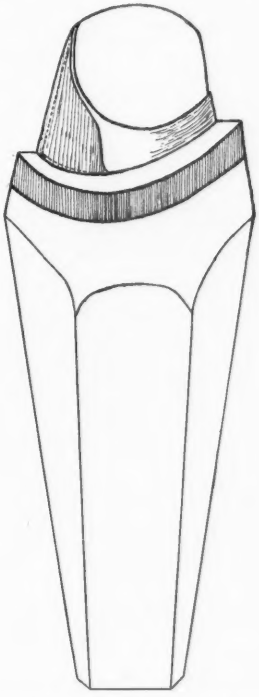


Fig. 19.—Metal shoulder and metal extension on distal surface of bicuspid ready for female inlay attachment.

Porcelain jackets have little adaptability to removable bridgework for anterior teeth. Sometimes, it is necessary to place a clasp around an anterior jacket and, as far as strength of the porcelain and tenacity of the cement is concerned, it is very practical. There

is little use for the combination gold and porcelain jacket with the inlay attachment for anterior teeth, the cutting away of the porcelain for the attachment weakening the crown.

CONCLUSION

The all-porcelain jacket shoulder crown should be used wherever possible

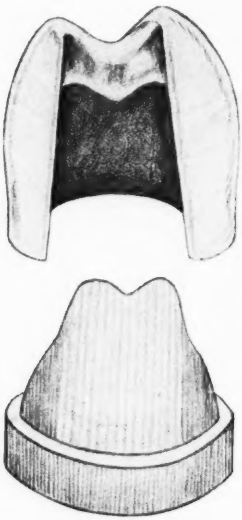


Fig. 20.—Porcelain jacket cut away to admit female inlay attachment to metal.

on account of the thorough and complete technic which can be employed and the ideal esthetic results possible. However, as previously stated, there are times when, in the posterior part of the mouth, this restoration becomes somewhat heroic, and I have found the combination gold and porcelain jacket crown to be a worthy substitute. The technic is difficult and demands extreme care both in the operating room and in the laboratory. Although it is indicated almost exclusively in posterior teeth, I have used it to advantage in anteriors where the gum margins had

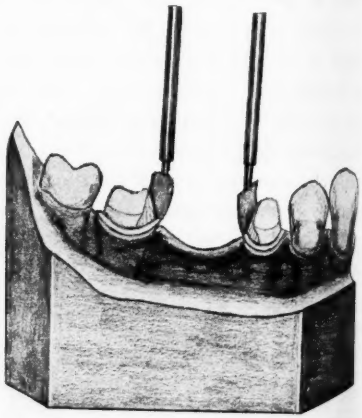


Fig. 21.—The female inlay attachments are paralleled and inlay wax is added to fit the attachments to the porcelain jackets.

receded and the necks of the teeth were not exposed to view. The bridge with the inlay attachments described is indicated in a very limited number of cases.

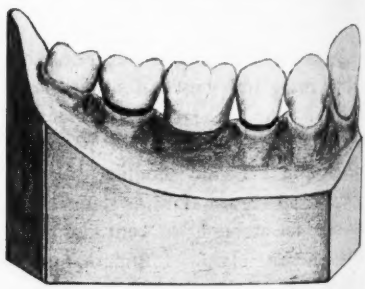


Fig. 22.—The completed bridge.

There must be sufficient tooth structure lost in the abutment teeth to admit the inlay attachments and to provide ade-

quate occlusal thickness of porcelain. From an esthetic standpoint, they are to be highly recommended.

DISCUSSION

A. E. Bonnell, Muskogee, Okla.: Was it a high or low fusing porcelain that was used in connection with gold?

William Tracy, New York City: It seems to me this is a subject to engage the attention

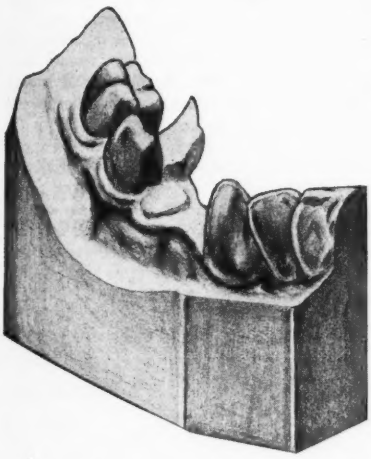


Fig. 23.—Model of case for which a Peeso tube and split pin was used in the bicuspid root, and porcelain jacket crown with metal shoulder and inlay attachment for the first molar.

of anybody who is interested in porcelain work, as an unusual application of porcelain. It occurred to me when Dr. Bastain was showing the pictures that there might be some criticism about the integrity of the finished piece—I don't mean in the workmanship but in the principle of applying the porcelain up against the gold bridge attachment. I have seen this work, and I know how beautifully Dr. Bastian can execute it. There can be no criticism of the technical aspect of the work, but it is a question in my mind whether, in the mouth of the patient who uses considerable stress in mastication, we aren't going to have some chipping and fracturing of the porcelain at its most delicate points. Now if that does occur, it might be very embarrassing to replace it, not to Dr. Bastain perhaps, but to one like myself who isn't familiar with it. I might be much embarrassed and much perplexed as to how to make a repair. I hope Dr. Bastain will devote a little time to discussing that phase of it.

N. W. Goodman, Los Angeles, Calif.: This is a type of work that all men who are interested in porcelain work should study and become familiar with. There are, to my mind, a great many points which would, in the hands of the average man, be rather difficult

Fig. 24.—Radiogram of case shown in Figure 23.

to handle. I should like to ask Dr. Bastian just how he would repair a fracture of the porcelain, especially when used for bridge construction. It has never been my pleasure to see many of these cases in practical use. Dr. Bastian's technic is beautifully shown here, and in his clinic probably a great many points are brought out that will answer some of the questions.

Dr. Bastian, (closing): I employ a high fusing porcelain for jacket crowns. I think perhaps the most interesting thing I can tell you is how I first came to make this type of crown. A patient came to me with a large number of defective amalgam restorations, which I replaced with mesioclusodistal gold inlays. When I was through, the patient informed me I should make a wonderful jeweler. There was a time when patients did not object to gold if it showed but a little, but now if they open the mouth, look in the

mirror, and find a big arcade of gold, they are displeased. This is particularly true with lower teeth. When I began using shoulder jackets in the lower second bicuspids and first molars in preference to large gold inlays, I must admit that I got into difficulties at times. The tooth could be prepared to the point where all excess roundness was removed without much trouble, but cutting the shoulder, using the contra-angled handpiece, would result in the destruction of a large amount of tooth structure. Now it is all very well to tell the other men to make that shoulder as small as possible and go just so far beneath the gum, but we have a more or less limited time in which to work, and we have the feelings of the patient to consider. In lieu of the shoulder crowns, I have made many of the crowns described, and have been much gratified with the results. The appearance of the gold around the necks of the posterior teeth is not displeasing, especially in the lower jaw. I exclude the anteriors entirely in this discussion; that is a different proposition. As regards the bridge with the inlay attachment, it is only once in a while that you find a case suitable for this type of work. Figure 23 shows the model of the last case in which I made a bridge of this type. I first made a bridge with a large mesioclusodistal gold inlay in the first molar. The patient objected to the gold. I remade the bridge using a porcelain jacket with a gold shoulder on the molar and a Peeso tube and split pin in the bicuspid. (Fig. 24.) The weak point in the porcelain jacket for this type of bridge lies mesiodistally along the center of the occlusal surface. There would be a weakness if the gold supporting the attachment was not strong enough to bear the stress. So far, the only breakage I have had occurred in the laboratory. I repaired this as follows: The gold shoulder and metal upright were placed in position on the amalgam die on which the crown was first constructed; a copper band was fitted and a modeling compound impression taken. An amalgam die was made, and then a porcelain jacket constructed to fit the die. This technic can be followed in the case of a breakage in the mouth. It would be very unwise to make this type of bridge for a strong bite. Fortunately, men do not demand this kind of bridgework but are perfectly contented with gold inlays. For the average person with normal bite, I have found them practical and satisfactory.

DENTISTRY: A PUBLIC HEALTH SERVICE

By STEPHEN RUSHMORE, M.D., Boston, Massachusetts

(Address to the Alumni of Tuft's College Dental School, Boston, Mass., Feb. 11, 1925)

WHAT is public health? Sickness and health are personal, and certainly a private affair. On the other hand, we are all so bound together that what affects one, affects all; so that, if anyone wants to have a little private illness of his own, for example measles or whooping cough, or even heart disease, he can't do it. Each one of us is affected, though perhaps only remotely, by the illness or health of all others in the community. I am not going to try to solve immediately the problem as to what we are going to do, if there is no such thing as public health, and no such thing as private health. On the metaphysical side, it is an old problem, going back at least to the time of Aristotle. But I shall consider some of the relations of medicine and dentistry, and I desire to point out that which they have in common rather than that which constitutes their differences.

It is a matter of common experience that if there is a difference in the family, the best way to bring harmony is to introduce some one from outside to take part in the controversy. Promptly family differences are forgotten, and all unite in the attack on the outsider. So I shall begin with a criticism which has been made of medicine, but which applies, I think, with equal force to dentistry.

A thinker, not a physician, has said: "The trouble with the physicians of our day is that they separate too much the soul from the body." Is not a similar criticism of dentistry just? "The trouble with the dentists of our day is that they separate too much the teeth from the body." And in this criticism there is contained no reference to the activity of the dentist in the extracting room, nor, in the case of the physician, any reference to the enthusiastic young surgeon who has a high mortality among his patients. The point of the criticism is that we all have a tendency to forget the whole in the consideration of the part. We must not forget that in practice, in the art of medicine and in the art of dentistry, we are dealing with persons whose minds or bodies show some indication of disease.

The criticism of the physicians to which I have referred is to be found in Plato, and by Socrates is put into the mouth of the physician to the king of Thrace. If this tendency among physicians has persisted for 2,300 years, and the criticism is as applicable today as it was then, in spite of vast progress in knowledge, there has been little improvement in the spirit of the medical profession.

It is characteristic of the scientific mind to search for the cause of things,

and the physician has ever sought for the cause of disease.

The term cause we may use in a practical or in a scientific sense. Practically, the person who lights a match and applies it to inflammable material is responsible for the fire, whether for good or ill. But scientifically, the cause is all the conditions without any one of which the fire could not exist, as the lighted match, the inflammable material, oxygen. In the case of many diseases, we say that the germ is the cause of the disease. But we must not forget the other conditions without which the disease could not exist. From the point of view of the body of the individual, we comprehend many of these factors under the term resistance of the patient. Perhaps too much stress cannot be laid on the part the alimentary tract plays in the resistance of the patient. It represents a great field in physiology, little explored and less understood. How many colds are due to overloading the alimentary canal?

It is especially important for those of us who are interested in health to emphasize the diminished resistance of the patient as a cause of disease. Some germs we hope to destroy, as the typhoid bacillus. But some germs I think we shall always have with us, such as the tubercle bacillus, the streptococcus, the staphylococcus. In our health education, or education for health, if we can get people to think of life as a battle between one organism, our body, and many organisms, or germs, in which victory will depend both on the blows we can deal before the enemy reaches us, and on our armor, our resistance, we shall go a long way in spreading abroad the conception of health as aggressive and positive, instead of the mere absence of disease. Public health and private health differ only in the point of view. It is the same individual who is sick or who is well. From the point of view of the individual, it is a private matter; from the point of view of the community, it is a public matter.

It has been said that the nineteenth century was analytic, and that the twentieth may well be synthetic. I think that I see such tendencies in philosophy, religion and science, except perhaps theology. Perhaps we may have a bringing together of the fragments of the scientific specialties that have been produced. Medicine and dentistry certainly are coming closer together. I look forward to the time when dentistry will be a specialty of medicine, because it can have its proper place, its proper function, only when it sees the part in the light of the whole. When that time will come, I do not know: perhaps very quickly; perhaps not in our generation. But that it will come, I am sure, and we should all do what we can to bring about what we must all regard as desirable, if we only look at the matter without prejudice or personal bias. To regard dentistry as a medical specialty today is to fail to look facts in the face. The view of a few dentists with the medical outlook does not now dominate the dental profession. What can be done to facilitate the transition to the better time to come?

In the first place, the physician and the dentist should have the same start. Whether we regard two years of collegiate work as necessary, or three or four, or only one, the requirements as to time and content of the course should be identical.

I know it has been said that if the preliminary requirements are the same, few will go into dentistry, since they can go with the same effort into medi-

cine. I do not like to think of dentistry as an intrinsically lower profession than medicine. As I see it, there is opportunity in dentistry as a medical specialty for some of the best minds.

Several schemes have been suggested for dealing with the student when he begins his professional work. A recent suggestion is that the dental course be reduced to three years. I regard this as of questionable value, and certainly only a makeshift. It has been suggested that the first and second years be the same in the two courses, the third and fourth separate for the medical and dental students. I shall return to this in a few moments. It has been suggested that dentistry be taken only after three years in the medical school, the medical degree being given after four years and the dental degree after five years. It has been suggested that dentistry be taken only after the medical degree has been conferred. This may lead to a separate degree for each medical specialty, conferred only after a special course has been pursued by the graduate in medicine.

But I would suggest as a transition stage the beginning of dentistry after two years in the medical school, modifying these years along lines that I pointed out some time ago. If we regard the student's week as consisting of eleven half days, six mornings and five afternoons, I would have six half days devoted to three parallel courses in the anatomy, physiology and pathology groups. I would have five half days devoted to medicine about as follows: two to internal medicine and its subdivisions; two to surgery and its subdivisions, and one to obstetrics and gynecology. The day would be divided as follows: a didactic lecture from 9 to 10; practical work with patients from 10 to 12; a clinical lecture from 12 to 1, and, in the afternoon, an informal talk and laboratory from 2 to 5. Saturday morning would be a laboratory period.

All students would take this course for two years, in practice less rigid than in the schema. With this medical course as a foundation, with two years of training in the fundamental sciences, and considerable clinical experience, the dental student would spend two years in special courses in dentistry. I am told by those who know more than I do about dentistry that this would be adequate.

But that in which I am chiefly interested is not suggestions as to schemes. It is to emphasize the importance of the dental point of view for the physician, and the importance of the medical point of view for the dentist. The two professions need each other, and they must come closer together. And yet the adequate point of view is not that given by the needs of the professions; it is that given by the needs of the patient. The person who is sick needs to be regarded from a point of view which comprehends his teeth and the rest of his body, his whole body and his soul.

The Journal of the American Dental Association

58 East Washington St., Chicago, Illinois.

OTTO U. KING, Business Manager, C. N. JOHNSON, Editor.

Published by the American Dental Association.

All expressions of opinions and all statements of supposed facts are published on the authority of the writer over whose signature they appear, and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association.

Communications intended for publication in the scientific or literary pages of THE JOURNAL should be addressed to the Editor. All advertising or business matters should be sent to the Business Manager.

Subscription is included in the annual membership dues. To nonmembers living in the United States or its possessions, the price is $2.50 a year in advance; Canada, $3.00; Australia, $4.00; other countries, $3.25. All foreign subscriptions are to be paid in United States money.

Entered as second-class matter, March 22, 1915, at the post office at Huntington, Indiana, under the Act of August 24, 1912. Published Monthly.

Editorial

THE SEVENTH INTERNATIONAL DENTAL CONGRESS

In the city of Philadelphia, August 23, 1926, there will convene what is confidently expected will be the greatest dental meeting in the history of the profession to date—the Seventh International Dental Congress. America will be host to the dentists of the world, and at the present writing, the plans are so well advanced that a successful meeting is assured.

The section officers have reported to the president, Dr. Logan, and the program of scientific papers and demonstrations thus far secured is most encouraging. In all, more than 100 papers have been promised. There has been a unanimity of cooperation on the part of the writers and thinkers of the profession that is very gratifying to the officers, and the various sections report their quotas nearly filled. This is a remarkable showing thus early in the development of the scientific machinery of the Congress, and it may be taken as an earnest of the ultimate success of the meeting.

There seems also to be an active interest on the part of the profession in other countries. Europe will send a large delegation, and it is hoped that South America, the Orient, Australia and New Zealand will be well represented. Canada will, of course, send her best men, and will take an active part in the program. Cuba is always interested in international congresses, and we may confidently expect a good delegation from there.

The clinical and practical features of the meeting are being well organized, and every man attending may be assured of a real treat whether his interest lies in the deepest scientific lore or in matters of the most intensely practical and utilitarian kind. Entertainment will not be forgotten, and the social features of the meeting promise to be very attractive. In large enterprises of this character, much, of course, depends on the efforts of the Local Committee, and in Philadelphia there is a body of men who are working most faithfully and efficiently to make this meeting the greatest ever held.

One fortunate feature of the Congress, and one which will appeal to those in attendance, lies in the fact that all of the activities of the meeting will be housed under one roof. This tends to greater convenience, and makes it possible for the members to visit the various sections without loss of time. They may go from one section to another, and select those papers from each which most appeal to them; thus getting the greatest good with the least inconvenience. When the section meetings are widely separated, an element of discomfort and confusion is introduced, which greatly interferes with the profitable employment of time and the general enjoyment of the meeting.

All in all, the plans for the coming Congress seem to be maturing in a very satisfactory manner, and all that is necessary to make this an epoch in the history of dentistry is for every man to put forth his best effort either in the form of a paper, a clinic, or faithful work on a committee, or even by lending the inspiration of his attendance. There is an impulse given to a meeting by a large attendance, and this Congress promises to outstrip all other meetings held up to this time.

A UNIQUE NECKLACE

In 1912, when the editor was on his way to the South Sea Islands, he had the pleasure of calling on his old friend Dr. J. M. Whitney of Honolulu, Hawaii. During this visit, Dr. Whitney exhibited a necklace of human teeth, the history of which was as follows: It had been purchased originally from a cannibal chief of one of the South Sea Islands, and each tooth represented a victim in warfare from whom the chief had eaten. The exhibit so impressed the editor that he never forgot it, and on Dr. Whitney's recent retirement from practice, he wrote urging him to make provision whereby the necklace should be placed in safe keeping for all time, with its true history. It is manifest that, in this stage of the world's development, no such souvenir will ever again be brought to light, and this one should be preserved. There is, of course, still a remnant of cannibalism existing, but no such extensive practice as is represented by this necklace.

To the overwhelming surprise and delight of the editor, Dr. Whitney graciously assured him that he knew of no one to whom he would rather trust the safekeeping of the necklace than to the editor himself. Accordingly, in due time, the necklace was received, with the following history written by Dr. Whitney:

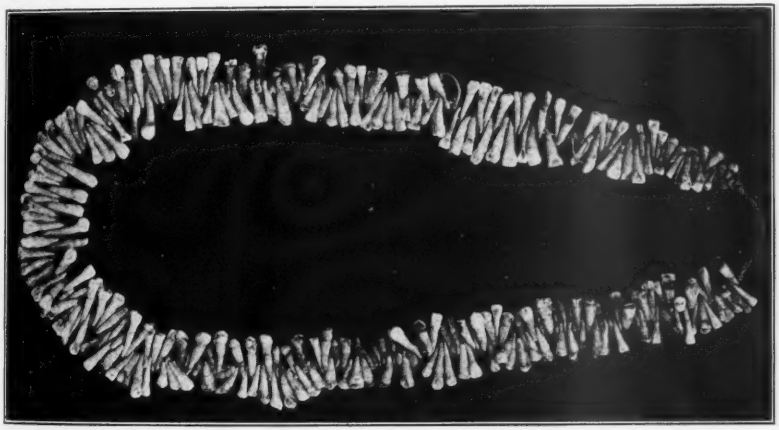
HISTORY OF NECKLACE OF HUMAN TEETH

In the possession of J. M. Whitney, M.D., D.D.S., of Honolulu, T. H.

This necklace of human teeth was purchased forty years ago from a lieutenant of our Navy on his return from a cruise among the Marquesan or South Sea Islands. He said that he had purchased it from a chief of one of the islands, who told him that each tooth represented a person from whom he had eaten, before the missionaries had visited his island, but by their teaching, his life had been changed so that he had no further use for the necklace and was willing to part with it for a price. The special value attached to this necklace is that it was received first hand from the lieutenant who bought it from the chief. I have every reason to believe that the statement of the lieutenant as to how it came into his possession is correct.

The editor finds it quite impossible to express adequately to Dr. Whitney his appreciation of the confidence reposed in him, and he promises that the utmost care will be taken of this historic souvenir, and that it will eventually be placed in a museum and its history recorded, with Dr. Whitney's name associated.

There are many points of interest connected with a study of this necklace. It contains in all 275 human teeth of all kinds, from the worn down incisors and biscuspids of age to the teeth of children with the apical foramen not yet perfectly formed. There is, of course, not a filled tooth in the entire lot, the inference being that the cannibals did not catch many people of civilization. In fact, it is stated on good authority that the cannibals of the South Seas cared less for the flesh of the white man than that of the native because it was too salty.



A necklace of human teeth.

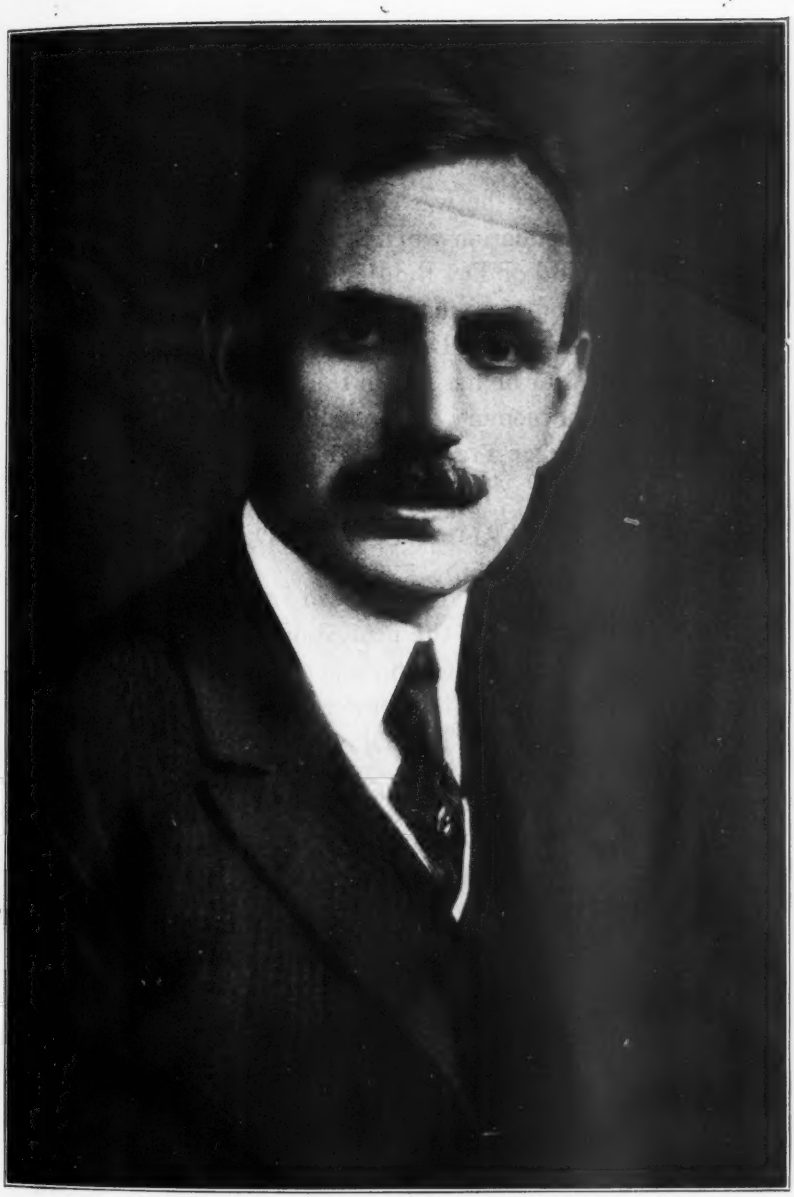
Today we are naturally horrified at the mere mention of cannibalism, and, as has been intimated, it can never again exist as it once did. But when we scan the criminal columns of the daily papers in all of our large cities, we are led to wonder if, after all, there is a greater respect for human life than there was in the palmiest days of cannibalism. The natives had certain vices which shock us, and yet, taking them "by and large," their ethical relations compared very favorably with those of their white brothers, and when the whole story of the association of the white race and the native is carefully studied, the native need not hang his head quite so low as should the white man.

JOHN FLOCKER BIDDLE, D.D.S., F.A.C.D.

We regret to announce the untimely death of our President-Elect, Dr. John F. Biddle, on January 17, 1926. Dr. Biddle had not been well for some time, and on January 9 he had an abdominal operation, from which presumably he never recovered. We are not in possession of full particulars at the time of going to press, but we wish to place on record an expression of our sincere regret at his passing, and to testify to his many excellent qualities as a man and a dentist. His loss will come with especial force to the official family of the American Dental Association, of which body he was a prominent and distinguished member. He was also President of the Section on Oral Surgery of the coming Seventh International Dental Congress, and had worked out a splendid program for this meeting.

Dr. Biddle was born February 16, 1882, in Pittsburgh. He was educated in the public schools, and took instruction in Stevenson's School of Art. He was graduated as a doctor of dental surgery from the University of Pittsburgh in 1903. He was ex-president of the American Institute of Dental Teachers; the Pennsylvania State Dental Society; the Lake Erie Dental Association, and the Dental Council of Pennsylvania. He was a Fellow of the American College of Dentists and Past Supreme Grand Master of Delta Sigma Delta Fraternity. He had for some time been a Trustee of the American Dental Association. He was an honorary member of the Rhode Island State Dental Society, having been awarded a silver medal by that body. He was also honorary member of the Corydon Palmer Dental Society of Ohio. He was professor of clinical dental pathology, radiography and minor oral surgery at the University of Pittsburgh; and was a dental surgeon on the staffs of Mercy Hospital and the Allegheny General Hospital of Pittsburgh.

In his all too brief career, he left an impress on American dentistry which was very distinctive. He was aggressive in a healthy constructive way, but he never trampled on the rights of others. His ability was far above the average, and he employed



JOHN FLOCKER BIDDLE, D.D.S., F.A.C.D., Pittsburgh, Pa.
(1882-1926)
Late President-Elect of the American Dental Association

it for the betterment of his suffering fellowman. To the student and young practitioner, he was particularly helpful, and while he always held them to strict accountability in their professional and personal conduct, he was ever ready to grant to them a full measure of commendation when it was merited.

In the passing of Dr. Biddle, the profession has lost one of its most useful and constructive workers, and in the ranks particularly of the American Dental Association, his place can never quite be filled. But he has left in the hearts of his associates and friends a fragrant memory of good cheer and comradeship; and to the profession at large a rare heritage of faithful devotion to duty.

EDWARD S. GAYLORD, D.D.S.

On January 4, 1926, there passed from the arena of life one of the finest characters in the profession of dentistry. Dr. E. S. Gaylord of New Haven, Conn., after a brief illness with pneumonia, answered the final summons, and left behind him the memory of a life well and profitably lived.

He was born in Gaylordsville, Conn., August 6, 1840, being thus in his eighty-sixth year. He studied dentistry in the office of Dr. Elias Strong in New Haven, and afterwards entered practice for himself. His professional career was one of unqualified success, and he continued practice up to the time of his illness. In 1913, the Baltimore College of Dental Surgery conferred on him the honorary degree of D.D.S.

Dr. Gaylord had been president of the Connecticut State Dental Association, the Northeastern Dental Association, the New Haven Dental Society and the National Dental Association. He was also Past Supreme Grand Master of Delta Sigma Delta Fraternity. Every office came to him unsought, and he graced the positions that were tendered him with signal ability. No man was less ambitious than he to achieve power or place, and no man ever accepted an office of trust with a greater sense of its respon-

sibility. He was faithful to the last degree, and never ignored a duty that was assigned to him. Conscientious in everything he did, and modest in his demeanor at all times, the profession found an especial pleasure in heaping on him all of the honors in its gift.

Dr. Gaylord was one of the earliest advocates of the Relief Fund for the American Dental Association, and it was to him a source of great satisfaction to see the signal success which this movement finally achieved. He had the pleasure of living to see actual and tangible relief administered to his suffering fellowmen, and for an individual of his great heartedness and wealth of charity this was the rarest achievement which could have come to him.

It may thus be stated that Dr. Gaylord lived a rare and well-rounded life—a life filled not only with the essence of usefulness, but with the flowers of friendship. Along his pathway, he flung the blossoms of kindly acts and goodly cheer, and the cheer came back to him as it always does to men who live the kind of a life that Dr. Gaylord lived.

In his passing, the profession and the world at large have lost a real champion of the right, a beautiful and lovable character, and a distinct asset to the general uplift of humanity. His life was a blessing and his passing a benediction.

THE DENTAL SUMMARY SUSPENDS

In the December, 1925, number of *The Dental Summary*, the publishers announce its discontinuance, and, in a modest editorial, Dr. L. P. Bethel says "Vale" to his readers. We regret the passing of this splendid publication, which has done so much for the welfare of the profession in its particular field. It was started in 1881 as the *Ohio State Journal of Dental Science*, under the able editorship of Dr. George Watt. In 1885, Dr. Louis P. Bethel became associate editor, and on the death of Dr. Watt, in 1893, he became editor, a position which he has held with ability ever since. In the meantime, the name was changed

L. P. BETHEL, D.D.S., M.D., F.A.C.D., Columbus, Ohio

to *The Dental Summary*. During the forty years which Dr. Bethel has given to this work, he has always maintained the best traditions of his craft. He has had no pet personal theories or ambitions to exploit, and has gone along, month after month, faithfully furnishing his readers with material which he thought was best suited for their welfare, and for the betterment of the profession. He has consistently refrained from intruding his individual ideas in the editorial pages, and has set an example of modesty and faithfulness which is most commendable.

It seems unfortunate that *The Dental Summary* should suspend, but the hope is here expressed that Dr. Bethel may not lay aside his pen. The profession needs the sane point of view which has always characterized his utterances, and he will have an ample avenue in the various publications now represented in dental periodical literature.

CALL AT YOUR CENTRAL OFFICE

The plea is hereby made to the members of the American Dental Association, wherever located, to call at the central office of the Association, and see the machinery of your own organization. The General Secretary and his splendid staff are working here every day in the interests of our great Association, and it is to them a matter of encouragement and inspiration to have the members call whenever they are in Chicago and see what is being done on their behalf. Remember it is *your* organization, and this is your central office. The staff are seeking from you constructive suggestions as to improvement in their service, and these suggestions can be made to better advantage if the members will visit the office and see what is being done. Possibly if more of the members visited the central office and noted the activities going on, they would feel more like attending the meetings. The address is 58 East Washington Street, in the central part of Chicago, convenient to all dentists visiting the city. A most cordial welcome awaits any of our members.

DEPARTMENT OF DENTAL HEALTH EDUCATION

LAY EDUCATIONAL ACTIVITIES OF A DISTRICT DENTAL SOCIETY

By F. DENTON WHITE, D.D.S., Minneapolis, Minnesota

(Read before the American Dental Association, Louisville, Ky., Sept. 23, 1925)

LAY education on all matters relating to mouth health must come directly or indirectly from the dentist.

There are many ways of educating the public. We have the schools, the newspapers, good health magazines, the radio, mouth health weeks, moving pictures and various efforts which are not strictly dental society activities but which need the cooperation of dental societies, such as public health work, settlement house clinics and health contests and exhibits at state and county fairs.

The Schools

Here, in my opinion, is the field where we have the greatest opportunity to educate the children to the importance of good teeth and good health, and how properly to care for the teeth. Ninety-nine times out of one hundred, if you win cooperation of the child by leading him to understand the importance of a clean and healthy mouth, you will win the interest of the parents as well. As stated before, the parents can be educated through the children, and we must always remember that most of these children will one day be parents, and the knowledge that they acquire in school will always remain with them. How often I have heard a parent say, "What wouldn't I give now if I had only been taught when a child in school the proper care and the importance of good teeth. I know I would have better teeth today."

The Minneapolis District Dental Society, through its oral hygiene committee, has cooperated with the board of education at all times. At the time the board appointed a supervisor of oral hygiene, five years ago, the society made certain recommendations, which were adopted without a single change, the result being that Minneapolis has a wonderful and complete educational program in the public schools. Last year, we had four reparative clinics, and five prophylactic clinics, with six graduate dental nurses who did only educational work in the class rooms and examined the children from the kindergarten through the sixth grade. The dental nurses examined 48,000 children in eighty-seven schools and checked each school, on an average, five times during the year. In all the schools, at the end

of the year, we had an average of 45 per cent "good mouths." I mean by that that every child either had a "good" mouth at the first examination or had gone to his dentist and received a dental certificate from him stating that he had done all necessary work at that time. A good mouth means having the teeth clean and free from stains and deposits, with no cavities and no broken down teeth which could not be filled. We, of course, could not take into consideration the matter of irregular teeth in these examinations. This work could not have been done at all without the cooperation of every dentist, and the good results would not have been attained had not the dental society cooperated in every way.

To Miss Gladys Eyrich, of Jackson, Miss., belongs the credit for the inspiration which started the educational work in our schools, along the lines on which it is being conducted at the present time. Many of our ideas are what we received from the work she has been doing in the Jackson schools.

THE NEWSPAPERS

A great amount of the right information can be given the public through the newspapers, provided it is written in popular form so that the people will read it, and also so that it can be understood. Along with this, the matter of questions and answers to inquiries helps to a great extent. The Minneapolis District Dental Society began such a campaign May 18, 1924, having an article appear in each Sunday edition since that time. One of our leading newspapers donated space equal to a column each week and the society pays to have the articles written. We believed it was out of the question to ask busy dentists to donate their time to the writing of these articles. The president of the society appointed an editorial board whose duty it is to edit each article before submitting it to the editor of the newspaper, and the editor, in turn, edits the article so that it appeals to the public, from the newspaper's point of view. The public today is eager to obtain reliable information regarding teeth and their relation to general health. I am sure that, next to the radio, the newspaper reaches the greatest number of homes. How many read these mouth health articles no one can determine, but from the number of people who write in, asking questions, I am sure a great many do. At the present time, the society is selling the mouth health articles to other societies, and are also publishing them in booklet form to sell to dentists for distribution to patients or for use in their offices. If any of you are interested in this work, you can write me or the secretary of our society, and we will gladly give you more detailed information.

HEALTH MAGAZINES

We should use our influence in encouraging our patients to read good health magazines, and discourage the reading of inferior ones, which seem to have a large circulation. Some people enjoy reading articles of this kind written in a sensational style. Good health magazines should be on our reception room tables at all times, and we should encourage our patients to subscribe for them also.

Two good health magazines are *"Hygeia,"* which is published monthly by the American Medical Association and costs only $3.00 a year. The other is the *Northwestern Health Journal*, which is published monthly by the

Minnesota Public Health Association, of St. Paul. This magazine costs but 50 cents a year.

Many of our members are cooperating with the *Northwestern Health Journal* by writing for it on subjects concerning which they feel the public should be enlightened. The *Journal*, in turn, has given us valuable assistance for the advancement of our work. They have offered to aid us financially in the carrying on of our radio work. What a splendid opportunity for any society when such organizations as the Minnesota Public Health Association are willing to cooperate as they are with us. We should encourage this all we can.

HEALTH WEEKS

Most of you are familiar with this phase of the work, so I will not take the time to describe it and how it can be conducted. I firmly believe in Health Weeks and Health Days, and it is my opinion that they should be conducted in all sections of the country each year. The Minneapolis District Dental Society has conducted preventive dental weeks for the last two years, and also assisted in a big health week which was put on by our local medical society.

During our health weeks, we have had prize dental contests, talks by both physicians and dentists in the schools, moving pictures in the theaters and schools, exhibits in both store and drug store windows, a great deal of newspaper publicity (one of our newspapers donating the money for the prizes), a preventive dental week supplement in one of our Sunday newspapers and special lessons on mouth health in the school classroom during the week, and 85,000 pamphlets on "Good Teeth—Good Health" were distributed to the school children. One year, we ended our week with a big mass meeting, the speakers being Dr. Charles H. Mayo of Rochester, Minn., and Dr. Wallace Seccombe of Toronto, Canada. About 4,000 attended the meeting.

MOVING PICTURES

Good moving pictures have fine educational possibilities when used with school work and at parent-teacher meetings and mothers' clubs and during health weeks. It goes without saying that we should be very careful in the selection of films which tend to advertise some dental preparation or sponsor a certain method of brushing the teeth. We have many good films and they should be used more extensively than they are at the present time. The matter of cost has been reduced so that they are now within the reach of most organizations wishing to do this type of work. In Minneapolis, we have used both pictures and trailers to call attention to our health weeks, etc.

VARIOUS EFFORTS NOT STRICTLY DENTAL SOCIETY ACTIVITIES BUT NEEDING COOPERATION

Our society has always cooperated in all public health work. We have two members who are members of the Hennepin County Public Health Association, one being at the present time vice president. We have one member on the board of directors of the Hennepin County Tuberculosis Association. We also have a city dental clinic committee whose duty it is to cooperate and assist with the various outside agencies and settlement house clinics in their clinical and educational work. We have cooperated with the Minnesota State Oral Hygiene Com-

mittee in their work, and more especially with its activities at the state fair. Here, the state committee conducts a prize dental contest and a dental health exhibit.

THE RADIO

The radio as a means of education is in its infancy. It has wonderful possibilities, if the educational features are conducted properly. We can broadcast material suitable for adults, and we can form children's clubs, through which both the children and the society can broadcast programs consisting of material along both dental and general health lines. This serves two purposes: (1) it is interesting to the children, and they unconsciously become educated in mouth health; and (2) information is disseminated to those who listen in.

We have a children's hour every Friday evening from 5:30 until 6:00 o'clock, over the Gold Medal Station, WCCO, St. Paul-Minneapolis, and a health club has been formed which is known as the Court of Gold Medal. This work, up to June, has been conducted by the Minneapolis and St. Paul district societies. At the present time, it is being conducted by the Minnesota State Dental Society, and is under the direction of the Oral Hygiene Committee.

The Court of Gold Medal is very much of a reality to the children who listen in. We have characters who are the rulers of the Court, such as King HyGene, and Queen Health. We have the Councellor of the Court, whose duty it is to preside over each session and attend to all matters pertaining to the arranging and broadcasting of programs, writing letters to the members, etc. There are three stages of membership and each stage requires that the child live up to certain health rules. The first stage is that of a Subject, the second, a Page or Maiden, and the third, a Knight or Lady. When a child writes in asking to become a Subject, we send him a certificate of member-

Fig. 1.—Certificate awarded by Court of Gold Medal.

ship with one gold seal on it, together with the complete rules and regulations of the Court of Gold Medal as well as a letter which explains more fully what is expected of each member. As each child advances, he receives a gold seal for every stage until he has three. The rules and regulations of the Court of Gold Medal, which is governed by King HyGene and Queen Health, are as follows:

HOW TO BECOME A SUBJECT

Any child is eligible to become a Subject of the Court of Gold Medal on agreeing to observe the rules of a Subject:

Brush the teeth every day.
Sleep with windows open.

HOW TO BECOME A PAGE OR MAIDEN

If the Subject observes these rules and agrees also to live up to the rules required to become a Page or Maiden, he will so advise King HyGene, and the parent or parents of the Subject must also notify the King that the Subject has lived up to the rules. As soon as the King is so notified, he will send to the boy a seal stating that the boy is now a Page, and if the Subject is a girl, he will send a seal showing she has become a Maiden of the Court. The Page or Maiden will then attach the seal to the original certificate.

A Page or Maiden of the Court of Gold Medal is pledged to

Visit the dentist at least every six months.
Drink plenty of milk.
Drink water often during the day.
Chew food thoroughly and slowly.
Be polite.

HOW TO BECOME A KNIGHT OR LADY

If the Page or Maiden lives up to the rules and his or her parents so advise the King, there will then be sent a seal of Knight or Lady, if the Page or Maiden agrees to live up to the rules laid down for these positions of trust and honor. The Knight or Lady will then attach the seal to the original certificate.

A Knight or Lady of the Court of Gold Medal is pledged to

Do a good deed every day.
Eat at regular times.
Eat candy only after meals—never before.
Be careful of personal appearance.
Hair well brushed and clean.
Face, neck, ears and eyes well cared for.
Hands washed and nails cleaned before meals and at bed time.
Clothes and shoes neat and tidy.
Carry a clean handkerchief always, to be used when sneezing or coughing.

For next year, we have arranged that the boys and girls who have advanced to the stage of Knight or Lady in Waiting will be able to advance still farther and become Counts and Countesses. One of the requirements for this next stage will be that they have ten of their little friends join the Court of Gold Medal.

Each school and each school room in Minneapolis and St. Paul that has reached 100 per cent in the matter of good teeth is allowed to "tell the world about it" over the radio during one of the sessions of the Court.

To give you some idea of our programs and the work that the children are doing, I will quote from an article which appeared in the *Minneapolis Journal* last Spring under the heading "Kenwood Pupils Go on the Air Tonight to Tell the World How They Acquired Perfect Teeth."

Three hundred and fifty boys and girls at Kenwood School washed and scrubbed their teeth a little harder than usual today, because tonight they will go on the air, to tell the world over WCCO how they raised their percentage of perfect teeth 56 per cent in ten months and became the third school in the city with 100 per cent teeth.

Every single tooth in the school is in perfect condition—graphs and certificates and medals and what not all over the schools walls testify to that. For months, the children have heard about teeth and health in assembly periods. They've watched their rooms rise and fall on the charts and today they were triumphant.

"The children themselves are responsible for raising Kenwood's percentage," Miss Gladys McAlister, principal, said today. "The children urge each other and they listen to their peers when they won't listen to their teachers."

At 5:30 p. m., Junior Barnum will announce Kenwood's teeth program. The fifth and sixth grades will give "Health Smiles;" Geraldine Berry, 4A grade, will give "First Aid in Mike's Family;" Lorraine Sager, 2B, just 7 years old, will give a violin solo; Ruth Confer, 3A, will tell how to keep well. A little playlet, "Mother's Hygiene Lesson," written by Theron Loveland, of the 6A grade, will be given; the fifth grade will give original health rhymes and jingles; Florence Lang of the 7A grade will give "Kenwood Crusaders." Jack Atwood, 2A, will give "A Secret;" Mrs. Lillian Nippert Zelle will give a violin solo, accompanied by Mary Sue Zelle, 6 year old first grader.

And then the children wrote acrostics like this one by Bessie Pils, 6A, to help them remember:

T is for Teeth, the topic of my talk
They help you as much as feet help you to walk
E is for Eating which you cannot do
Without good teeth to help you chew
E is for Energy clean teeth will give
You must keep them so if you want to live
T is for Toothache which you will get
If you are careless and to brush them neglect

Fig. 2.—Pageant given by pupils representing the "100 per cent" rooms.

H is for Health, and you must remember
To brush teeth in July as well as in December.
Teeth is my whole, so shiny and white
To keep them so, brush them morning, noon and night.

And then there was this one, also written by a 6A pupil from the same school:

H is for Hygiene, King of our Court
Where brushing our teeth is of great import.
E is for Energy that clean teeth will give
The cleaner we keep them, the longer we will live.
A is for Ache which some of us get
If you don't watch out you'll get a false set.

L is for Lime which we get from milk
Drink it and have teeth as fine as silk
T is for Toothache that all children fear
So go to the dentist at least twice a year.
H is for Happiness, the greatest of treasures
To keep teeth clean is the greatest of pleasures.
My whole is Health, our good queen's name.
If you want to be healthy, play the tooth game.

Usually each room makes up its program, and most of their material is original, consisting of dental and health songs, poems and stories. As you will note, some of the children have even written playlets, which have been broadcast at different times. On the occasion of our last session, June 12, we had a pageant in which about 125 children took part. Each child was dressed in a costume which represented something pertaining to teeth or health. We had a boy and girl from each 100 per cent room in Minneapolis and St. Paul. At this last session, we named one girl Lady in Waiting, and one boy Knight. These two children represented all the children in the Northwest who had lived up to the rules and were entitled to receive these honors.

We will continue with the broadcasting of our Court of Gold Medal programs at the opening of school in September. We thought it best to discontinue broadcasting during the summer months because so many of the children were away from home, and if not away, would not care to listen in when they would much prefer to be out of doors at this hour.

The radio, and especially the large stations, reaches a great many people. We started our children's Court of Gold Medal in December, 1924, and up to the time we closed for the summer months, we had between 12,000 and 14,000 members. These children live in all parts of the Northwest and in Canada.

We are greatly indebted to Station WCCO for their cooperation in making the work successful. They have done everything possible to make it so.

To you who are especially interested in society oral hygiene activities, I would say: Keep up the good work, doing all you can all of the time. Although you may be discouraged at times, you cannot help doing some good to someone.

DISCUSSION*

H. L. Banzhaf, Milwaukee, Wis.: I want to congratulate Dr. White and those members of the Minneapolis District Dental Society who are responsible for the novel and ingenious methods that are being used to educate the children of that progressive metropolis to the importance of good teeth. The idea of using the radio is most timely, as well as attractive and entertaining. If the fact that I am just past my 'teens does not bar me from applying as a subject, I hope that Dr. White will use his influence with the Court of Gold Medal to admit me. I do not believe I have ever heard of anything more effective from the point of view of child psychology. I quite agree that the primary school offers the greatest opportunity to educate the public, not only because the children of today become the adults of tomorrow, but also because through the children a large proportion of the parents may be won over. If each child is taught the necessity of eating wholesome, nutritious food; if he is impressed with the importance of keeping his mouth in a clean condition, and if he is compelled to pass frequent mouth inspections, during the period of his attendance in the primary school, some of our problems with respect to education of the public will eventually disappear. We have made great progress during the last decade as to how to preserve and repair the teeth of man. Many mouth disabilities and abnormalities have been relieved and prevented. Nevertheless, we still do not know why teeth decay and why abnormalities occur in some children and not in others. That we are get-

*Other discussions of the papers of Drs. White and Buckley will be published with the papers of Dr. Hollister and Miss Schmidt in the March issue of THE JOURNAL.

ting away slowly from surface indications, and are beginning to realize that a biologic understanding is needed before we can make real progress in dental research, is a healthy sign. Until the truth respecting the cause of tooth decay is finally revealed, we must continue along lines pointed out by Dr. White and other investigators who are studying the problem of child health.

The rank and file of the dental profession cannot be expected to assume the burden of the education of the school children, because, if they did, it would take a major part of their time. This work should be delegated to hygienists and dentists who are employed by the school authorities: the hygienists to teach in the class room and assume the responsibility for mouth cleanliness in the pupils under their charge; the dentists to supervise the work of the hygienists to take charge of dental clinics for such indigent children as may be present in the schools. Our chief duty as a profession, as I see it, is to campaign for more school hygienists and more school dentists. When we succeed in proving to the public, our state legislatures, our county boards, our city councils and our school boards, that a few dollars spent for education as to the importance of mouth cleanliness will result in a happier and healthier people and less necessity for other public institutions for the care of the sick, and that it will mean an actual saving in dollars and cents—in taxes, then, and not until then, will we be on the way toward our goal. It has been pointed out again and again by students on this subject that diseased teeth, and infected tonsils and adenoids, are the direct cause for the failure of many children to be promoted each year. The saving affected by the elimination of a large proportion of these failures is in itself enough to pay for the additional cost of the instruction in health dentistry. As a profession, we should use all of the political influence that we can muster to put through a thorough program for dental education in the primary schools. We should also see to it that more attention is paid to the matter of teaching correct habits of diet in the primary schools. While I am not optimistic in believing that we can ever induce all of our people to eat proper foods, I believe that we can at least reach the children in our schools. I was pleased to note that the rules for promotion in the Gold Medal Court give some recognition to proper habits of diet. Dr. White's paper is an important contribution to dental literature because it is full of practical thoughts. The suggestions that he has given us are concrete enough so that we can all go home and try them out.

DENTAL EDUCATIONAL WORK AMONG CIVIC GROUPS

By JOHN P. BUCKLEY, Ph.G., D.D.S., F.A.C.D., Los Angeles, California

(Read before the American Dental Association, Louisville, Ky., Sept. 23, 1925)

ACCORDING to the statements of prominent educators, one of the encouraging signs of the times lies in the fact that the great educational institutions of the country are fast coming to realize that, during the past decade, the trend of higher education has been too materialistic; that natural science has taken precedence over social and moral science, and that they have been equipping too many students to go out into the world and win financial success, without impressing on them the age-old truth that when character is lost, all is lost.

No one can dispute the fact that a generation lacking in character, whatever its material achievements, is a generation wasted. Students of history are fully aware that all economic and industrial progress emanates from a moral or cultural impulse. Whenever

the morals of a people become decadent, economic and industrial disintegration quickly follows. On this basis of character and morals, every great people has developed, and when the base began to disintegrate, the superstructure soon crumpled.

Without doubt, the most important of all the sciences to the present civilization is the science of mankind. The teacher, wherever found, who has not planted in the mind of his student some of the principles of the science of right living has failed. Educators everywhere today are placing physical education on a par with learning, if indeed they are not considering it as standing first. The child's health is recognized as the foundation of its welfare and success.

During the past few years, it has been my privilege to assist others in educating laymen along the lines of physical education. In this relation, I have appeared before many civic organizations, such as service clubs, women's clubs and chambers of commerce, and everywhere I have spoken, it has been gratifying to note that both men and women are deeply interested in this important subject. There was a time when men, for the most part, felt that they were too busy with the, seemingly, to them, larger problems of life to bother with such trivial matters as the health and morals of a community. They thought this was the work of women. This is not true today.

In this connection, we need only present facts to support the argument advanced. It is a simple matter to show that the health problem is a community problem, along with that of morals, law and order. If the streets of a city need repair; if the little old red school house, as it were, needs a new roof; if the teaching in the public schools needs be watched, as it does today, in order that insidious propaganda may not creep in to poison the minds of your child or mine, with the ultimate aim of undermining the constitution of the United States; if the police force is inadequate or inefficient; if the fire department is not functioning properly; if the death rate is too high; if conditions are such as to make it easy for the boys and girls to do the wrong thing; I say, if any or all of these problems present, it is a matter in which every citizen is interested; for it is the voice of the city speaking, the very soul of the community pleading with its citizens to get busy and do something. I repeat that the health service problem from the dental or any other standpoint, if properly presented, appeals to men and women alike.

In the city of Los Angeles, I have charge of the outpatient department of the Dental College of the University of Southern California; and my work there takes me to several of the corrective and eleemosynary institutions for children in or near the city. This last year was the first for the department. We began, in the fall, with two institutions, and closed the year with nine, with applications still coming in without any solicitation whatever. Of the institutions served, two are Catholic and seven are Protestant. It may interest you to know that Catholics and Jews provide far better for their delinquent children than do Protestants.

In serving the institutions, selected senior students, always two at a time, are sent on special days of each week, and free dental service is thus provided. This service is deeply and fully appreciated by the authorities in charge and all others interested in the children. I may say in passing that it is a labor of

love for me to superintend this work, and I consider it one of the greatest opportunities for service that has ever been presented to me. No one can engage in this kind of work without being moved to exert every effort to assist these unfortunate and underprivileged children in every way possible in becoming good citizens. Almost every child has a life story that would move one to tears. Little do we appreciate the physical, mental and moral handicaps under which so many of the children are reared, unless we make a little investigation for ourselves. Let me relate two or three instances that have come to my attention.

At one of the homes for boys, we found two brothers, about 10 and 12 years old. Both are bright boys, and let me add here, good boys. Both parents are living in this case, and when the father was asked why he did not provide for his children, he replied with an oath, and referring to the mother, said, "She wanted them, she has them now, let her take care of them." Would you believe that brutes like that lived and were masquerading under the guise of men? The poor mother did labor to provide as best she could until her mind gave way under the strain; now she too is a charge on the state in one of the hospitals for the insane.

We were asked to furnish service for another such home for boys. With two seniors, I drove the 40 miles for an investigation and preliminary examination. This was a Protestant home that had recently been established by a small group of philanthropic individuals. There were forty-nine boys there at the time, and all were lined up for the examination. While the senior students were noting the condition of the mouth, I was taking the name and age of each boy. When I asked one boy please to step into the chair after I had taken his name and age, he hesitated. Then I noticed that he was handcuffed to a boy by his side. Neither boy was embarrassed, as I was to think that I had not noticed the condition before. We examined these boys as they stood. I shall never forget the next boy in line. He came forward bright and smiling and gave me his full name, "John Henry Harrison." This is not the exact name, but it was as good an American name. He seemed so proud of it. All the other boys were satisfied to say "Ed" or "Dick" or "Tom." Not so with this boy, he was "John Henry." When the examination was completed, the attendant asked if we remembered the "Harrison" boy. Of course we had; he was different some way. Then we were told that the boy's father was in the San Quentin Penitentiary and his mother in the Patton Insane Hospital. His name was about all the poor boy had of which to be proud; and we can be both proud and ashamed of our name. What future has a boy like that, and is there any wonder that he was temporarily, I hope only temporarily, confined?

Another institution cares for both boys and girls. Here our students work with rubber gloves to avoid infection. A girl about 14 years of age is in the chair. She is above the average in appearance. In this case, the question came up as to whether it would be best, under the conditions, to treat or extract a badly decayed lower first molar. I advised extraction. The girl remarked that she thought her mother would prefer to have the tooth extracted by the family dentist when she got home. This was satisfactory to us; but forget-

ting for the moment where we were, I perhaps thoughtlessly asked, when she would be home. The look of indifference would have shocked you, had you heard her reply, with a smile on her face, "Search me." Here was a girl, someone's daughter, 14 years of age, a rather nice appearing girl, who did not know whether she would be away from her parents and home, three days, three weeks, three months or three years; and to all external appearances, she cared less. Do you wonder that this work grips one so thoroughly?

But what, you may ask, has this to do with interesting civic groups in dental education? Just this; relate some of these experiences and direct attention to the condition of the mouths of children of school age, here and everywhere, emphasizing how much better it is to prevent than to try to restore, and civic groups are at your command.

The Hollywood Kiwanis Club built an addition to a hospital at the Los Angeles Orphans Home, where they have 120 fine boys and girls, all orphans or half orphans, for this particular institution does not encourage divorce by caring for children from broken homes; and the Club equipped a room with a complete dental outfit. The service is furnished by our outpatient department of the dental college; and, in a year's time, no child in the Home will have an unfilled cavity in any tooth, nor will there be a single neglected mouth, unless found in new recruits which enter from time to time. Specialists, furnished by the Kiwanis Club, also examined the eyes of all the children and found twenty needing correction. Of these, there were five whose parent or guardian could not afford the expense of glasses, and these were paid for out of the dental fund. A check in the school these children attend showed that they were retarded in their studies, as were also the children with bad mouth conditions.

Before leaving the outpatient department of our college, let me say that the effect on the senior students who perform this service is of real value. It teaches them early in their professional career that there is something besides the dollar sign as an ideal in life; and I recommend such a department to other colleges. Wherever located, the need and demand will be found. The work in Los Angeles is confined entirely to children. Our aim is to develop normal, robust children, as free from physical defects and disease as is humanly possible, with high ideals built upon a groundwork of healthful habits begun in early life. In other words, the aim is to assist others interested in making good citizens of these underprivileged children.

In Southern California, as everywhere today, dental service in the public schools is receiving due recognition, and many cities there are employing both dentists and hygienists, either part or full time. Long Beach has had this service in the schools now for two years, and at the end of the first year, it was reported by Superintendent Stevens that repeaters were reduced 10 per cent. The Pasadena schools have employed dentists and hygienists for a number of years, having a building equipped for this special purpose and maintained by the school board. Recently, I heard a Pasadena dentist tell incidentally of an experience in his office. A mother had brought in a young girl of school age, whose mouth showed every evidence of neglect. The dentist remarked that evidently the child had not lived in Pasadena long. The mother said that

was true, that they had recently moved to the city, and in surprise asked how he knew. His reply was significant: "No child could attend the public schools in Pasadena for any period of time and have a mouth in a condition like this." No greater compliment could be paid to a school board or to a community.

If your community will not back dental work in the public schools or your school boards are not interested, go home and find out what it costs the tax payers of your community each year to educate a child in the grade school. Ask for the number of failures last year and multiply this number by ten, on the basis of the Long Beach report. Present the facts to your civic groups, service clubs, etc., and ask them as citizens and tax payers if it is worth considering. Surely you will get a hearing and results will follow.

CONCLUSION

May I quote from an article by Dr. D. J. McCarthy, professor of medical jurisprudence of the University of Pennsylvania?

> One thing we can do is to see that every child that is normally born, with the right given to it by Nature to a fair chance of good physical and mental health, is protected in the period of growth from disease that cripples and alters the chemistry of the body; to see that the child has the right to a sane education, and that the duty of the citizen is to offer the child to the schools free from disease, of normal weight, and with pure red blood; to see that what is vicious in the environment of the child is removed, and when the home environment is bad, to have this corrected by the moral pressure of the community. This would mean control by the state of the health of the child; a most detailed medical and psychological study in the preschool period, repeated at the adolescent or high school advancement. If all these were successfully accomplished, I feel quite certain that the State of Pennsylvania would not have 28,000 insane to care for, and 21,000 delinquent children to cope with in order to make the state a safe place in which to live.

Before the World War, we thought we were a healthful nation. But when the stethoscope and laboratory tests were applied to the very flower of our country, we learned a different story. The cause for many rejections was defective or missing teeth or bad mouth conditions, with the usual sequelae. Dentistry is endeavoring to do its full share in changing these conditions and is taking an active part in the great health service program that is being staged everywhere today.

DISCUSSION

H. L. Banzhaf, Milwaukee, Wis.: Success in work of this kind requires an individual who loves his fellow men, who is willing to give generously of his time, who delights in the relief of suffering and who enjoys association with the meek and lowly. The greatest good that will come from the work that Dr. Buckley is doing is the effect it will have on the dental students who are privileged to engage in it. It opens their eyes to their opportunity to do good. It gives them an idea of the extent of the problems that they must face. It widens the scope of their knowledge and heightens their interest in the profession they are about to enter. At the school with which I am associated, we do a similar work for the orphans of Milwaukee. However, instead of sending our students to the various institutions, we have the children come to our clinic. This is a disadvantage in one respect, because the student would undoubtedly secure a valuable training by visiting the orphanages and other homes for the unfortunate, and thus become familiar with the work that is being done by such institutions. Such an experience builds character, and the building of character has been too much neglected in our modern educational institutions. The great advantage of bringing the children to our clinic lies in the fact that we are completely equipped to take care of their needs at the school and therefore can serve them more quickly and more easily, as well as giving them more thorough attention. At the school we are provided with laboratory and roentgen-ray facilities, as well as with

all of the other necessities. We take care likewise of the children in the Milwaukee public and parochial schools when parents are too poor to provide dental service for them. From the happy expressions on the faces of these little tots, it is evident that they consider the visit a holiday, that they look on it as a welcome break in the daily routine of their existence. The city of West Allis, a suburb situated just to the west of Milwaukee, delivers and calls for all indigent public school children every morning in various publicly owned conveyances. One day, I looked out of my office and was startled to see a police patrol wagon backing up to the curb. I was, as you might imagine, much relieved to see twenty happy children climbing out of its crowded interior, together with the teacher in charge and being ushered into the clinic building. The real reason that has deterred us from establishing extramural clinics such as Dr. Buckley has described is that it takes the full complement of our seniors and juniors to take care of the patients who present themselves at the clinic. To withdraw a considerable number of them for this work would handicap those members of the faculty who have charge of the clinic and throw too great a burden on the remaining students. However, after reading Dr. Buckley's paper, I am going to give this matter further consideration, especially as this relates to the establishment of outpatient clinics in the various penal institutions whose inmates cannot visit a dental school clinic. I want to compliment the State of California on the progress that has been made with respect to dental service in the public schools as reported by Dr. Buckley. I hope that the dental profession in other states will follow this inspiring example and that there will soon be no public or private school of primary grade that is without the services of a sufficient number of dental hygienists to ensure that each child receives instruction on matters of correct diet and mouth cleanliness, and also a sufficient number of dentists to direct the work of the hygienists and take care of the mouths of such indigent children as may be present. We will have gone a long way in our endeavor to educate the public with respect to the relationship of a clean mouth to a healthy body when every school board throughout the length and breadth of this land provides the same facilities as do those of the cities of Long Beach and Pasadena.

TEETH AND HEALTH

A RADIO TALK

By ARTHUR D. BLACK, A.M., M.D., D.D.S., Chicago, Illinois
Dean of the Northwestern University Dental School

TWENTY-FIVE hundred years ago, the importance of the condition of the teeth in relation to the general health was recognized; for we find, in a report of excavations in the ancient city of Nineveh, in Assyria, by Professor Omstead, translation of a statement by a physician to the king, who was sick, which gives certain directions and prescriptions, and concludes with these words: "The pain in the king's head, in his body and in his limbs, comes from his teeth, and they must be extracted."

Dentistry was practiced as a special branch of the healing art before the time of Christ. Herodotus wrote: "The art of medicine is so practiced in Egypt that there is found an individual healer for each individual disorder. Some take charge of the disorders of the eyes; others those of the head; others those of the teeth," etc.

Little is known of the dentistry of these early days, or for several hundreds

of years thereafter. A little book, published in Germany in 1530, refers to the use of gold foil for filling cavities in the teeth. The last chapter in the book tells how to treat the scalp to prevent the hair from falling out, reminding us of the barber-dentists of that time. For it is a fact that the barbers of that day extracted teeth, and they doubtless also treated toothache. One writer says that the best treatment for a tooth with an aching nerve is to heat a wire red hot and then poke it into the nerve cavity. It goes on to say that this kills the nerve and stops the toothache, but sometimes the tooth gets loose and drops out a few days later. So we see that dentistry has made some progress in recent times.

The first dental college was established in Baltimore in 1839, eighty-six years ago. Since then dentistry has become a splendidly organized profession, with about fifty good colleges, most of them departments of universities, in the United States and in Canada. The American Dental Association, now holding its annual session in Louisville, Ky., has about 35,000 members, out of about 55,000 dentists in the United States.

The members of this association contribute one dollar each per year to a research fund that is used to assist scientific investigators who are constantly searching for methods of relieving pain, preventing dental disease or perfecting the newer methods of technic.

Decay of the teeth, which is the forerunner of chronic mouth infection, is increasing rapidly with our higher civilization, apparently owing very largely to changes in diet. In the Smithsonian Institution, there are more than 500 skulls of Eskimos, the large majority of whom died a hundred years or more ago, before contact with our civilization. The teeth of these skulls show no decay. The Maori and other partly civilized tribes of the South Sea Islands are almost free from decay of their teeth. The ravages of decay in the mouths of children in this country is retarding the mental and physical development of untold thousands.

Chronic infections about the teeth, by secondary involvement, through the blood stream, of more vital organs, are probably shortening the average span of life by from five to ten years. Hundreds of thousands of teeth have been extracted during the past ten years in the treatment of disease elsewhere in the body, and it is one of the most important problems in medical research to find a means of preventing the infections that make it necessary to extract so many teeth.

During the past twenty years, gifts amounting to more than $100,000,000 have been made for medical education and research, while those given to dentistry amount to less than $5,000,000. In view of the well known relationship between mouth infections and diseases elsewhere in the body, persons of wealth should provide money for thorough scientific studies of these conditions. I know of no finer way in which one could serve humanity.

ADDITION TO THE BOOK SHELF

Food, Nutrition and Health. By E. V. McCollum, Ph.D., Sc.D., and Nina Simmonds, Sc.D. This book, which is reviewed in the January issue (p. 161), may be borrowed for a week, provided postage is paid by the recipient both ways.

THE UNION HEALTH CENTER DENTAL CLINIC

By GEORGE M. PRICE,* M.D., New York City

THE dental clinic of the Union Health Center in New York City is a unique as well as a pioneer institution. Unlike the dental clinics established by employers in industrial plants within the last ten or fifteen years, the Union Health Center Dental Clinic was established by a labor organization. Whereas, the industrial plant clinics owe their initiative to the employers, who as a rule bear the burden and the expense of the dental work, the Health Center Dental Clinic serves not one plant but four thousand plants employing sixty thousand workers in the women's garment trade in New York City.

The Union Health Center is a workers' institution, owned, managed and financed by the workers themselves and by their representatives. It differs from most of the industrial clinics in that it is not housed in a factory building, but is located in a separate building, unique in its modern equipment. This year, the dental clinic of the Union Health Center has taken a large floor in one of the loft buildings in the industrial center of the city in order to increase its facilities. The clinic does not limit itself to prophylaxis or extractions as do many of the industrial clinics It renders all kind of service, from prophylaxis and extractions to the most complicated prosthetics, as well as orthodontia.

The Union Health Center Dental Clinic was established in May, 1917, with three chairs, at 31 Union Square. In 1920, it was increased to ten chairs, and removed to 131 East Seventeenth street. In its new place, to which it has recently moved, at 222 Fourth Avenue, it has twenty-two dental units, a separate surgical room, a prosthetic room, and a large roentgen-ray room. It also has a special department for children and orthodontia work.

The present equipment of the clinic consists of twenty-two units, thirteen of them having new Harvard chairs with Weber standard model units; one, a complete Ritter unit, and the rest S. S. White and other chairs and units. A Wappler Senior roentgen-ray machine has recently replaced the two older machines, which have been used during the last five years.

The work done in the clinic is limited to the members of the International Ladies Garment Workers' Union and their families. Most of the work is done for the members themselves.

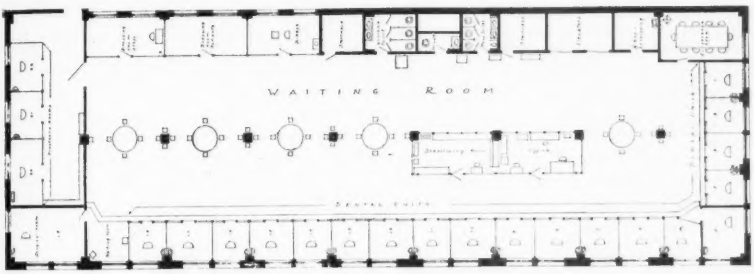
Great stress is laid on the educational and prophylactic features of the dental work. Every patient examined receives prophylactic treatment. Each is taught the rudiments of mouth hygiene, and arrangements are made for semiannual visits. Crown and bridge work are discouraged as much as possible; the restoration of the teeth is urged, and needless extractions are avoided.

The clinic is supervised by a competent, experienced dentist. The staff is recruited from the ranks of dental

*Director, Union Health Center, New York City.

practitioners who have had experience in their profession. A number of dentists are engaged for full time; that is, from 10 a. m. to 8 p. m., at salaries ranging from $2,500 to $5,000 a year. Most of the dentists, especially those who come for the three evening hours, from 5 to 8 p. m., are paid by the hour, their fees ranging from $1.50 to $2.25 per hour.

The charges made for dental work are based upon the average overhead and the cost of the professional work, and



Dental Clinic, Union Health Center, New York City.

are about $4.00 to $5.00 an hour. Charges for extractions are from $1.00 to $3.00; roentgen-ray examination from 50 cents each to $3.00 for an entire series, and prophylaxis, from $1.50 to $2.00 an hour.

The dental clinic has been patronized by the workers from its inception, and the accompanying table shows the attendance as well as the financial income of the clinic from 1920 to 1924, inclusive.

DATA OF CLINIC WORK (1920-1924)

	Patients	Treatments	Income
1920	1,555	12,383	$28,033.86
1921	1,997	15,373	38,270.97
1922	2,802	20,379	48,625.56
1923	4,502	26,788	59,117.52
1924	4,586	28,939	64,079.23

The figures for 1925 are not as yet available, but they show a slight decrease over those for 1924. It is expected that in 1926 the clinic will have an income of at least $100,000, with about 7,000 patients.

ORAL HYGIENE IN HAWAII.

In the October, 1924, issue of THE JOURNAL, there appeared an article on "Oral Hygiene in Hawaii," by Dr. A. Clifford Braly, director of the Bureau of Mouth Hygiene and the Honolulu Dental Infirmary. Miss Helen M. Baukin, supervising dental hygienist for the Department of Public Instruction of the Territory of Hawaii, adds another chapter to the interesting and well-organized work in a letter recently received. She writes:

"We have just started our fourth year of dental hygiene in the Territorial Public School, with a staff of twenty dental hygienists, and one supervisor. We feel that we have done wonderfully well considering the large territory we have to cover as our work is divided into areas covering every district. This past year we took care of 28,746 children, and worked in 121 schools.

"At present, all the hygienists in the employ are Island trained girls, but with the discontinuance of the school of hygiene for a two year period, I am afraid I will not be able to fill the quota next September. The territorial appropriation supports only twenty girls, and we did not feel that it would be well to train girls without having school positions for them. The school will open again next September, and I believe that we

will make it a two-year course in view of the fact that the hygienists are under the Department of Public Instruction, with salaries the same as those of elementary teachers, and are governed by the same rules and regulations as the teachers. It has been necessary for the hygienists to work eleven months of the year with a twelve months' salary, with hours each day 8:30 to 2:00, but this year we have lengthened the day 8:30 to 3:30, thereby eliminating the summer vacation work. The regular school day here is from 8:30 to 2:00. The hygienists will be paid their regular salaries throughout the vacation. I believe that it is a wise move to lengthen the course, thereby placing the hygienists on the same basis as teachers.

"The past legislature gave us an appropriation of $78,380 for the support of twenty hygienists and one supervisor; also the sum of $34,600 for the support of four dentists who will begin school work on the other islands and in rural Oahu, January 1. Honolulu school children are well taken care of with Mrs. Carter's liberal donation. It was possible also to amend the dental hygiene law so that we may employ dental hygienists from the mainland, who hold a state license, without subjecting them to another license in the territory. They will be given a temporary license to work under the Department of Public Instruction or Board of Health, this license only holding as long as they are in the employ of these organizations. If they desire to go into a private office, they will be required to take the examinations here."

FIELD NOTES*

All the dental societies of Newark, N. J., and vicinity are planning a mouth hygiene campaign under the supervision of Dr. A. Wolfson for the last week in April. It will be purely educational in character. A staff of speakers is being trained to address the children in the schools and civic organizations. With the cooperation of the Art Department of the Board of Education, a plan has been developed whereby a series of prizes will be offered for the best posters submitted by any high school pupil, the prize-winning poster to be used as the official campaign poster. During "Campaign Week" members of the dental profession will broadcast from Station WOR. The local newspapers will carry writeups, and a health show will be held in the Newark Y. M. C. A. Here, there will be exhibits on the various phases of the mouth hygiene problem, and nationally known speakers will address the audiences daily.

Michigan is to be congratulated on the appointment of Dr. William R. Davis as full-time director of the Bureau of Oral Hygiene and Preventive Dentistry, under the State Department of Health.

Dr. Harold S. Smith, Chicago, Ill., has been appointed by Dr. Isaac N. Rawlings, director of the Illinois State Department of Health, to the chairmanship of a child welfare committee working with the Illinois State Medical Society, the Illinois Federation of Women's Clubs and the Illinois State Department of Health. As chairman of this committee, Dr. Smith becomes *ex-officio* a member of the state advisory board of health. He will be in a position to indicate to that important body just how the Illinois State Dental Society can best serve the people of the State of Illinois.

RADIO TALKS

Radio talks on the following subjects written by the U. S. Public Health Service can be obtained through the Department of Dental Health Education, American Dental Association, 58 E. Washington St.

"Baby Teeth and Their Care."
"Bacteria and the Teeth."
"Decay and the Care of the Teeth."
"Eating for Health."
"Good Teeth."
"Halitosis."
"Health Habits."
"Mouth Hygiene."
"Oral Hygiene."
"Personal Hygiene."
"Pyorrhea Alveolaris or Rigg's Disease."
"The Permanent Teeth."
"Vitamins."

*The Department of Dental Health Education will be glad to receive items of news along the lines of education in dental or general health.

Medical and Dental News

Arkansas

Little Rock Clinic: A dental clinic was established recently in Little Rock "for the purpose of promoting and fostering the health of the community by educating the public as to the important bearing that the condition of the teeth has on general health; to emphasize oral hygiene, and to provide dentistry to underprivileged persons either without cost or at charges within reach of those financially unable to pay the established prices for such services." Active membership in the association includes two representatives from each organization contributing financially to its maintenance and two representatives from the Central District Dental Association living in Pulaski County; the Pulaski County Medical Society, the Pulaski County Tuberculosis Association, federation of women's clubs, Junior Council of Jewish Women, dean of the Arkansas Medical School, as well as health, county, city and school officials.

Officers of Little Rock District Society: The following were elected officers of the Little Rock District Dental Society, December 10: president, James O. Hall; president elect, C. W. Koch; vice-president, T. H. Harris; secretary-treasurer, M. O. Gephart.

Colorado

Dr. Smith Gives Clinic: Biley Smith, of Philadelphia, gave a clinic on construction of full dentures before the Colorado Prosthetic Club, at the Denver University Dental College, December 8.

Florida

Florida State Dental Society Officers: Following are the officers of the Florida State Dental Society: president, R. M. Sheetz, Bradentown; president-elect, L. W. Knight, Jacksonville; vice-presidents, F. L. Adams, Tampa, and C. J. Masters, Jacksonville; secretary, H. G. Bow, DeLand; treasurer, Roy J. Denning, Kissimmee.

Georgia

Cornerstone of Atlanta-Southern Dental College: The cornerstone of the new Atlanta-Southern Dental College was laid, December 21. The building, which will be four stories high, will be the first unit of a development costing about $500,000. Sheppard W. Foster, president of the college, and E. W. Martin, president of the board of trustees, gave addresses, and Thomas P. Hinman, dean, presided at the ceremony.

Idaho

First Meeting of Upper River Valley Association: The Upper Snake River Dental Association held its first meeting in Idaho Falls in December, with an attendance of thirty dentists, representing practically every town in this section of the state. This component society was organized to promote closer relations between members of the profession, and with a desire to keep in touch with the latest phases of dental science. Inlay clinics were given by A. M. Jacobsen of Pocatello and B. H. Hudson of Blackfoot. A banquet following the clinic program was presided over by the president, A. G. Miller of St. Anthony.

Illinois

Rock Island County Association Meets: At a meeting of the Rock Island County Dental Association, December 17, thirty-five members attended a banquet and heard Donald M. Gallie of Chicago give an illustrated lecture on "Oral Pathology and Diagnosis." The following officers were elected for the ensuing

year: president, Sidney A. Wiggins; vice-president, G. Arthur Nelson; secretary-treasurer, F. F. Helpenstell; all of Rock Island. A committee was appointed to cooperate with the public welfare association of Rock Island, Moline and East Moline in looking after the dental work of children of these cities. Like action will be taken in Geneseo, where the meeting was held.

Peoria County Society Meets: The monthly meeting of the Peoria County Dental Society was held at the University Club, Peoria, January 4. W. H. S. Heermans of Chicago, gave a clinic in the afternoon on "Common Errors in Denture Construction and How to Overcome Them," and in the evening lectured on "Esthetic and Physical Requirements in Denture Construction."

Appointment of Dentist in Health Department Desired: Following reports from more than 100 Illinois towns outside Cook County indicating that schools lack dental attention and instruction in mouth hygiene, the public service committee of the Chicago Dental Society adopted a resolution pledging the efforts of the society toward the establishment of a dental department within the state department of health. Of the 200 towns covered in a questionnaire, forty-five reported no dental examinations at all in their schools, twenty-four had regular examinations and sixty-six towns reported occasional inspections of the health of school children. Peoria is the only town that has a regular school dentist employed by the board of education.

Dentists Launch War on Quacks: Dentistry is being practiced in Chicago by hundreds of unskilled and unlicensed persons, according to charges made by the Committee on Infraction and Laws of the Chicago Dental Society. The society has appropriated $3,000 for a campaign against this practice, which will be conducted by a committee consisting of Frank J. Bernard, E. Byron Kelly and Frank J. Ryan. It is charged that complaints made to the state department of registration and education have not been properly pressed.

Chicago Dental Society Discusses Focal Infection: At the December meeting of the Chicago Dental Society, a symposium on the various aspects of focal infection was presented before a large audience, composed of local dentists and many members of the profession from a distance. The principal address of the evening was given by Thomas B. Hartzell of Minneapolis, who gave a "Review of the Literature Regarding Infected Teeth." Carl Beck, of Chicago, read a paper on "Focal Infections in Their Relations to Surgery," and U. G. Rickert, of Ann Arbor, read a paper on "The Laboratory Myths and Truths of the Pulpless Tooth." Papers were read also by Edward E. Miloslavich, professor of pathology and bacteriology of Marquette University, Milwaukee, Wis.; E. H. Hatton, of Chicago, and Frederick B. Noyes, Chicago.

Indiana

Officers of Grant County Society: At the annual election of officers of the Grant County Dental Society, E. B. Couch of Fairmount was chosen president and Earl Gear of Marion, secretary-treasurer.

Iowa

Ames Dental Clinic: Dentists from the University of Iowa, cooperating with citizens of Ames, staged a clinic, the first week in December, for children of preschool age. George W. Wandel, university dental clinician of maternal and infant hygiene, was in charge.

Kentucky

Owensboro Dental Clinic: A committee composed of representatives from the local dental society and the Lions' Club are completing plans for a dental clinic to be open throughout the year, and to be in charge of a dentist, permanently employed. It is hoped that the clinic will be a means of promoting the health of the indigent of the city. Funds are being sought from the various city organizations.

Minnesota

Northfield Dental Clinic: As a result of the examination of the school children of Northfield, due to the efforts of local dentists and the community nurse, defects were disclosed in the teeth of 340 of the 598 children examined.

Missouri

Southwest-Missouri District Dental Society Meets: At the annual convention of the Southwest-Missouri District Dental Society,

S. P. Bowyer, of Tulsa, Okla., gave a lecture and clinic on "Eradication of Focal Infection." Thirty-five dentists were in attendance, and the following officers were elected: president, Wayne C. Light, Carthage; vice-president, H. I. Maness, of Anderson; secretary-treasurer, L. B. Montgomery, of Joplin.

Springfield District Dental Society Meets: More than fifty dentists attended the annual meeting of the Springfield District Dental Society, December 14, at Springfield. R. T. Seibert, of St. Louis, gave lectures on "Amalgam Technic" and "Some Requisites for Silicate Manipulations." At the evening session, A. G. Magee of Kansas City, spoke on "Oral Infection and General Systemic Disturbances."

Rural Clinics: The Tuberculosis Society of St. Louis, which has promoted various health activities during the last year, in addition to its work in the prevention of tuberculosis, such as instruction to teachers along health lines, opening of new fresh air schools, circularizing physicians with the latest information regarding tuberculosis, enlarging the rest camp for self-supporting girls, promoting health education in the schools, and increasing health work among the industries, reports the success of the traveling rural dental clinics, which follow up the free dental inspections furnished by the dental societies. The St. Louis County Court helped in the purchase of equipment, but the maintenance and dental service is financed by the Tuberculosis Society. Last year, the traveling clinic visited 141 schools, giving treatment to 1,476 children.

Montana

Sixth District Dentists Elect Officers: The following are the officers of the Sixth District Montana Dentists' Association: president, L. A. Jenkin; secretary, A. P. Whittemore; councilman, J. E. Baker; all of Great Falls. The annual clinic convention will be held in the spring.

Libby Dental Clinic: At the dental clinic recently organized in Libby, a large percentage of pupils applied for treatment. Owing to a lack of funds to carry out all of the work desired, it was decided to perform only extraction, leaving the corrective work to be done at the option and the expense of the parents. It is hoped that the work can be carried through the first six grades.

North Dakota

Fargo-Moorhead Dental Club Meets: The regular biennial meeting of the Fargo-Moorhead Dental Club was held, December 12, clinics in gold foil work and other branches of dental surgery being presented.

Oklahoma

Central District Dental Society Elects Officers: At the annual meeting of the Central District Dental Society, at Oklahoma City, the following officers were elected: president, E. E. Sanger, Yukon; vice-president, John Payne, Oklahoma City; secretary-treasurer, F. H. Nowlin, Oklahoma City. The preceding day was given over to golf, lectures and a dinner dance.

School Clinic Started: The success of the first of a series of dental clinics planned by the board of education of Blackwell proved the need for this service. Clinics are held on Friday, the dentists of the city contributing their services in rotation.

Preventive Dentistry Exhibit: Preventive dentistry was demonstrated at the Roosevelt junior high school in Oklahoma City recently, the exhibit being prepared by the Oklahoma County Dental Society. After three days, the exhibit was sent on to another school, as a part of the campaign carried on throughout the state.

Success of School Clinic: As a result of the establishment of a dental clinic, which is sponsored by the parent-teacher's association, the Lee school dentist reports only sixty-five of about 1,000 children in need of immediate care, as against 179 found last year, at the time the clinic was started. A dentist employed by the association spends every Wednesday morning in the school examining pupils and outlining the work necessary, and directing mouth hygiene exercises in the classes.

Pennsylvania

Dr. Hollister Addresses Meeting: C. J. Hollister, chief of the dental department of the state department of health, spoke at Tarentum on the value of a dental clinic to the community. It is proposed to open a dental clinic in the Allegheny Valley.

Preschool Clinic: It is proposed to establish a preschool dental clinic in Reading, under the supervision of the visiting nurse's association, in order to keep the teeth of the city's children under observation until they come under the supervision of the school clinics. An appropriation of $1,000 is sought from the city, $500 to be spent for equipment, and the remainder for service.

Rhode Island

Annual Meeting of Rhode Island Dental Society: All dental and medical practitioners and social, educational and civic workers of the state were invited to attend a lecture by Harold DeWitt Cross, of Boston, on dental hygiene, the first day of a two-day meeting, held in Providence by the Rhode Island State Dental Society, January 13-14. The second day was devoted to papers and essays, followed by clinics. A banquet closed the meeting.

Tennessee

Ninth District Dental Association Elects Officers: The Ninth District Dental Association met December 16, at Martin. George P. Cousins of New Orleans gave a lecture and moving picture demonstration on mouth hygiene. Election of officers resulted as follows: president, E. M. Long, Union City; secretary, W. J. Jones, Union City; vice presidents: R. S. Macklin, Ripley; J. H. Meeks, Humboldt; O. L. Harkey, Sharon.

Texas

Dr. Gambati Honored: Dr. O. F. Gambati of Houston, Texas, for twenty-one years dean of the Texas Dental College, was honored by a banquet at the Houston Club, December 28, in celebration of his fifty years in practice. The members of the Houston Dental Society, who acted as hosts, presented Dr. Gambati with a loving cup.

Virginia

Richmond Association Elects Officers: At the annual meeting and dinner of the Richmond Dental Association, December 18, the following officers were elected for the ensuing year: president, J. M. Hughes; vice-president, L. S. Hoover; secretary-treasurer, A. M. Walsh.

Washington

Study Club Organized: Fifty of the ninety members of the Spokane County Dental Society have enrolled in a study club, which will cover gold foil work, inlays and porcelain work. A laboratory has been equipped for the purposes of the club.

West Virginia

Huntington Dental Society Elects Officers: The following were elected officers of the Huntington Dental Society for 1926: president, A. F. Wallen; A. E. Wulfman; secretary-treasurer, S. M. Calloway. Dr. A. G. Eisemann is the retiring president.

Foreign

Dental Editor Resigns: Mr. J. E. Payne, editor of *The Dental Surgeon* since April, 1919, resigned recently "owing to considerations of health and increased pressure on his time." Mr. Payne acted as sole editor until November, 1922, when the duties were divided, and he became general editor. His place has been filled by the appointment of Lt.-Col. A. J. Maurice, T.D., L.D.S.

General

Dental Clinic at Naval Hospital: A dental clinic, the first in the United States to be devoted solely to dental surgery and laboratory work, has recently been opened at the Naval hospital, Portsmouth. It contains a surgical room, dental operating quarters, roentgen-ray room, diet kitchen and a number of bedrooms for patients.

Editor of Student Publication Resigns: Owing to ill health, Dr. Gordon S. Gropp, recently resigned the editorship of the Dental Student Magazine, of which he was the founder. His work has been taken over by Dr. Axel Seaborg.

Army

Dental Corps: Capt. Vivian Z. Brown from duty at Army dental school, Washington, and from temporary duty at medical field service school, Carlisle Barracks, Pa., about June 4 to Fort Brown, Texas, for duty.

Capts. Ernest P. Dameron and James B. Mann, 1st Lieuts. James M. Epperly, James H. Pence, Everitte F. Arnold and Mackey J. Real from duty at Army dental school, Washington, and from temporary duty at medical field service school, Carlisle Barracks, Pa., about June 4 to Washington, Walter Reed General Hospital for duty.—*Army & Navy Register*, Dec. 26, 1925.

Capt. Henry A. Winslow to duty at Fort Benning, Ga., upon completion of service in Panama.

Capt. Page P. A. Chesser from duties at Fort Benning, Ga., to New York City, and about May 13 to Panama for duty.—*Army & Navy Register*, Dec. 12, 1925.

Birdsall, Charles C., New York City; University of Maryland School of Dentistry and Baltimore College of Dental Surgery, 1901; died, December 22; aged 60.

Deaths

Garnett, William F., Evanston, Ill.; Northwestern University Dental School, 1892; died suddenly, December 8; aged 63.

Kendall, Edward F., Terre Haute, Ind.; Indiana University School of Dentistry, 1901; died, December 10, after a two years' illness; aged 53.

McLaughlin, Richard G., Toronto, Canada, Department of Dental Surgery, Wisconsin College of Physicians and Surgeons, 1889; died recently; aged 66. Dr. McLaughlin was professor of ethics and dental jurisprudence in the Faculty of Dentistry of the University of Toronto.

Moore, John D., Pueblo, Colo.; Western Dental College, 1898; died, November 26, of heart disease; aged 56.

Morris, Devere B., Gainsville, Fla., Southern Dental College, Atlanta, 1904; died from heart disease, January 2; aged 46.

Nowak, Walter W., South Bend, Ind.; Indiana University School of Dentistry, 1919; died, December 27, suddenly; aged 30.

Reid, John D., Pana, Ill.; Indiana University School of Dentistry, 1897; died, November 30.

Smith, Wayne B., Chicago, Ill.; Northwestern University Dental School, 1924; died December 19, five weeks after an operation for appendicitis; aged 31.

Swain, Francis M., Kewanee, Ill.; Temple University School of Dentistry, 1885, died, December 3, after a long illness; aged 61.

Swartz, Helen L., Peoria, Ill.; Keokuk Dental College, 1900; died, November 11; aged 62.

Sweny, Clifford P., Cincinnati, Ohio; University of Michigan College of Dental Surgery, 1905; died recently; aged 58.

Theil, Louis A. Portage, Wis.; University of Maryland School of Dentistry and Baltimore College of Dental Surgery, 1907; died, November 19, of heart disease.

Wilhite, Pitts E., Salisbury, Mo.; Kansas City Dental College, 1892; died January 2, from pernicious anemia; aged 55. Dr. Wilhite had been ill for two years.

UNVEILING OF TABLET TO DRS. HARRIS AND TAYLOR

A bronze tablet dedicated to Drs. Chapin A. Harris and James Taylor, pioneers in dentistry, was unveiled, Nov. 30, 1925, at Bainbridge, Ohio, where Dr. Harris and Dr. Taylor started the study of dentistry, while practicing medicine, and near where Dr. Taylor was born. The tablet was presented by Drs. Edward C. Mills, of Columbus, and Charles W. Mills, Chillicothe, Ohio. The dedication preceded the annual meeting of the state society. The program of the dedicatory service was as follows:

PROGRAM

UNVEILING MEMORIAL TABLET

CHAPIN A. HARRIS — JAMES TAYLOR

Bainbridge, Ross County, Ohio

Monday, November 30, 1925, 2:00 p. m.

Dr. C. Stanley Smith of Cincinnati, Ohio, President Ohio State Dental Society, Chairman.

Invocation by Rev. D. Jenkins Williams, Ph.D., D.D., Columbus, Ohio.

Presentation of Tablet to Bainbridge on behalf of the dental profession, Dr. Edward C. Mills, of Columbus, Ohio, Secretary of the Ohio State Dental Society.

Unveiling by Charles W. Mills, Jr., of Chillicothe, Ohio.

Acceptance on behalf of Bainbridge, by Mrs. Marguerite Foraker-Newell, Bainbridge, Ohio.

Unveiling Address by Dr. Otto U. King, of Chicago, Secretary of the American Dental Association.

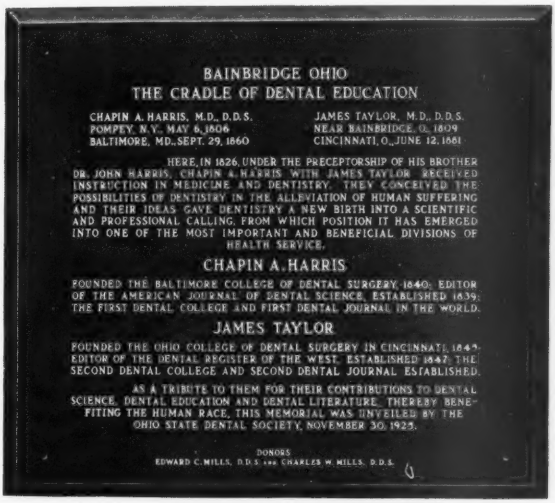
Remarks by Dr. Earl W. Swinehart, Baltimore, Md.; Dr. H. T. Smith, Cincinnati, Ohio.

In his presentation address, Dr. Edward C. Mills referred to Bainbridge as the "Cradle of Dental Education;" for it was here that, nearly 100 years ago, these two pioneers first conceived of dentistry as a noble, scholarly and independent profession.

The tablet was unveiled by Charles W. Mills, Jr., and accepted for the town of Bainbridge by Mrs. Marguerite Foraker-Newell.

The unveiling address was given by Dr. Otto U. King, of Chicago, General Secretary of the American Dental Association. Dr. King spoke of the hardihood and the vision of all pioneers, in whatever line of effort, and referred to them as the authors of all progress. When one gets the proper prospective, through a study of dental history, said Dr. King, one marvels at the work, the spirit, the foresight the altruism, of Harris and Taylor. It was their plan to develop a profession closely associated with medicine. In an era when each practitioner of dentistry

kept his methods and appliances jealously to himself, these men recognized the need for a dental college, where a broad, systematized training could be obtained. As a result of the labors of Harris, the first dental college was founded, in 1840, the Baltimore College of Dental Surgery. And in 1845, Dr. Taylor founded the second dental college in the world, the Ohio College of Dental Surgery. Harris was the author of a textbook on dentistry and the first dental dictionary, and founded the first dental journal. Taylor founded the second dental journal. Both were active in the establishment of the first dental societies in the country.


BAINBRIDGE OHIO
THE CRADLE OF DENTAL EDUCATION
CHAPIN A. HARRIS, M.D., D.D.S.
POMPEY, N.Y., MAY 6, 1806
BALTIMORE, MD., SEPT. 29, 1860
JAMES TAYLOR, M.D., D.D.S.
NEAR BAINBRIDGE, O., 1809
CINCINNATI, O., JUNE 12, 1861
HERE, IN 1826, UNDER THE PRECEPTORSHIP OF HIS BROTHER DR. JOHN HARRIS, CHAPIN A. HARRIS WITH JAMES TAYLOR RECEIVED INSTRUCTION IN MEDICINE AND DENTISTRY. THEY CONCEIVED THE POSSIBILITIES OF DENTISTRY IN THE ALLEVIATION OF HUMAN SUFFERING AND THEIR IDEAS GAVE DENTISTRY A NEW BIRTH INTO A SCIENTIFIC AND PROFESSIONAL CALLING, FROM WHICH POSITION IT HAS EMERGED INTO ONE OF THE MOST IMPORTANT AND BENEFICIAL DIVISIONS OF HEALTH SERVICE.
CHAPIN A. HARRIS
FOUNDED THE BALTIMORE COLLEGE OF DENTAL SURGERY, 1840; EDITOR OF THE AMERICAN JOURNAL OF DENTAL SCIENCE, ESTABLISHED 1839; THE FIRST DENTAL COLLEGE AND FIRST DENTAL JOURNAL IN THE WORLD.
JAMES TAYLOR
FOUNDED THE OHIO COLLEGE OF DENTAL SURGERY IN CINCINNATI, 1845; EDITOR OF THE DENTAL REGISTER OF THE WEST, ESTABLISHED 1847; THE SECOND DENTAL COLLEGE AND SECOND DENTAL JOURNAL ESTABLISHED.
AS A TRIBUTE TO THEM FOR THEIR CONTRIBUTIONS TO DENTAL SCIENCE, DENTAL EDUCATION AND DENTAL LITERATURE, THEREBY BENEFITING THE HUMAN RACE, THIS MEMORIAL WAS UNVEILED BY THE OHIO STATE DENTAL SOCIETY, NOVEMBER 30, 1925.
DONORS
EDWARD C. MILLS, D.D.S. AND CHARLES W. MILLS, D.D.S.

Tablet unveiled to Drs. Harris and Taylor.

They had been the first to recognize that there were three factors in dental education: the college, the society, the literature. Through their efforts and because of their vision, dentistry rose from the status of a trade whose secrets were guarded by its followers and disclosed only for a price, to a profession whose members gladly share with their colleagues every new idea, for the advancement of the science of dentistry in the service of mankind.

Dr. King paid a tribute to the Mills brothers, who were foresighted enough to see the value to this community and to dentistry in this recognition of the work of these two founders of modern dentistry.

Dr. Earl W. Swinehart, who represented the Baltimore College of Dental Surgery, paid tribute to Dr. Harris as a fine and broadminded citizen, and to his genius in laying the broad and deep foundations of modern dentistry. Dean H. T. Smith, of the Ohio College of Dental Surgery, spoke of the value of the memorial to the town of Bainbridge and paid a personal tribute to Dr. Taylor and to the Mills brothers.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

"Adventures on the Borderland of Ethics": The doctor seldom makes a swift and final diagnosis, seldom produces a triumphant remedy and departs in a blaze of glory. He does what he can professionally; but the larger part of his call is often social; he aims to encourage, to console, to amuse and distract, occasionally to instruct or to warn. To a family struck in a heap by the burden and terror of illness, he tries to make himself of use in all sorts of homely and humble ways. Much of this the minister of religion, in case he thinks that preaching is not his special talent, would like also to do in his parish work. But for this, I found on inquiring of my audience, the theological schools provide no training and no practice. It has been assumed apparently that skill and ability to help people in trouble could not be learned by practice while in the seminary—that men either had it by Nature and instinct or lacked it—but that in any case it could not be taught. Against this assumption I put the experience of medical students and medical practitioners, most of whom can testify that during their medical course they learned this unlearnable art, not, of course, as they would like to, not in that perfection which they could wish for, but vastly better than their own stumbling hesitating attempts when first they began. And how is it to be learned? By practice and by watching others who know it better. Medical students assisting in a hospital ward or in an out-patient clinic, listen to their "chiefs" as they open up a conversation, as they encourage, explain, console or rebuke their patients. They observe the steps by which a shy person, a reticent person is drawn out. They see how the ice is broken in difficult situations. They see how a visit is brought to a satisfactory conclusion. Then they try to do likewise; they find, of course, that they cannot copy their teacher's ways and expressions, but can usefully follow his methods. They feel out their own way of getting to know people, their own ways of bringing home an idea which they wish to impress.—Richard C. Cabot, in *The Survey*.

Mixed Cell Tumor of the Palate: A case of mixed cell tumor of the palate in a woman, aged 32, is reported by G. V. Boyko (*J.A.M.A.* Dec. 26, 1925.) The patient had suffered for four years from swelling of the palate, without definite pain or soreness. From a place to the right of the midline and opposite the molar region, it spread in all directions until it occupied most of the space between the molar teeth. Two years previous to examination, the swelling had been lanced, after which it increased in size. The patient was otherwise in good health. Under ether spray anesthesia, the tumor was shelled out *en masse*. It was necessary to remove a considerable portion of the mucous membrane of the palate with the tumor, which was enclosed by a fibrous tissue capsule and was attached to the palate by a flat, wide pedicle to the right of the median line. At this place, there was noteworthy absorption of the bone, of the palate. In the center of this region, the bone was entirely missing, the defect being 3 mm. in diameter. Sections showed nodules and cords of round and oval epithelial cells in an abundant connective tissue framework. There were many regions of mucoid degeneration. The author emphasizes that, while these mixed tumors are benign, they occasionally become malignant, making early removal advisable.

Athletic Strenuosity: For twenty-five years the tendency, in this country at least, has been to increase speed, until we have reached the age of little rest: almost no nerve and brain relaxation, and often not even enough muscle rest. The consequent mental and physical tire is interpreted by the business layman as a need for more exercise. If he cannot take regular exercise, he may drink more coffee or alcohol or use more tobacco, either to cause stimulation or to procure rest. When he does take exercise it is usually spasmodically,

mostly at week ends and excessively, to the point, frequently, of causing heart tire. If his exercise is golf, it is thirty-six holes instead of eighteen; if it is tennis, it is five sets morning and afternoon; if it is walking, it is a cross-country "hike" with too many hills and too much climbing. Even motoring for pleasure has become "speed and distance," at tension instead of with relaxation. The efficient man would advise regular training for the development of any set of muscles for any particular test, but he does not seem to realize that the heart is a muscle and that without training (regular, daily, gradually increasing muscle work) he pushes it to tire and often to exhaustion by his spasmodic, unregulated exertion.—*J.A.M.A.*

Rational Dental Hygiene: The requirements of a suitable and scientifically correct tooth cleaning remedy may be described as follows: 1. Chemically pure, and in every respect free from injurious ingredients. 2. Astringent and weakly antiseptic. 3. To clean mechanically by effervescing and very light grinding. 4. Be able to dissolve tartar and other deposits. 5. Entirely dissolvable itself. 6. Be able to reduce the viscosity of the saliva. 7. Strongly stimulating to the flow of saliva. 8. Should act as a direct prophylactic against caries. 9. Able to cure incipient caries. 10. Pleasant, refreshing, easy to use, and cheap.—G. Lind, in *Dent. Magazine.*

Remote Results of Plastic Operations: Jauristi gives illustrations of three adults operated on in childhood, with deplorable ultimate results. In one young man, after an operation at the age of 3 for osteomyelitis of the maxilla, with extensive loss of substance, the ankylosis was almost complete. He removed the solid mass formed by the teeth that had interlocked as they grew. The dental prosthesis then provided was made with a bulging portion that tended to correct the extreme asymmetry of the lower part of the face.—*Arch Espanôles de Pediat.*, abstr. *J.A.M.A.*

Ethylene Anesthesia: A report based upon experiences in 400 cases is given by H. A. Thompson (*Cur. Res. Anal & Anes.*, December, 1925). Two hundred were classed as major, and 200 as minor, cases. Half a dozen cases are reported in detail. The author reaches the following conclusions: 1. Ethylene shows less interference with normal body functions than any other known anesthetic. 2. It is preeminently the anesthetic of choice for the aged patient and the doubtful surgical risk. 3. In safety and ease of administration, it compares very favorably with nitrous oxid and oxygen and may be readily administered by any one who is familiar with the use of these gases. While we should never lose sight of its explosive character, if proper precautions be taken, ethylene is not to be given up on that account, as it is only slightly more explosive than gas-ether-oxygen mixtures. The author believes that preliminary experiences reported with ethylene warrant giving it a fair trial.

Free Service: What an alluring sound the word "free" has to the average individual, but when we come right down to cold facts, someone has to pay for everything that is donated. Medical men always have been liberal in giving of their time and services to the undeserving as well as the deserving, without monetary reward, and because of the charitable disposition displayed they have been imposed upon by all classes of people, and of late years to an alarming extent by the social workers and uplifters of various kinds. In consequence we have various organizations, some of them benevolent and philanthropic and others social or even commercial, that in some form or other furnish free medical and surgical services to people, some of whom are deserving of charity and others deserving of no such consideration. There are no other professional men or laborers who are imposed upon to such a large extent as the members of the medical profession, and, in reality, they have no one to blame but themselves for the present condition and what will develop in the future from it. Medical men do not have to break away from their charitable habits, for no doctor will refuse to render service to the worthy poor, but it is high time that their independence is asserted in the direction of refusing aid in extending dependency and pauperism.—*J. Indiana State M. A.*

Test Traits of Gifted Children: In a Leland Stanford University study of the mental traits of 1,000 gifted children in the California schools, physically the whole group stood well above par as they did in social and moral traits. Mental superiority, however, was declared to be due to superior innate endowment rather than to any differences in environment. The group contains more boys than girls but the highest individ-

ual rating was achieved by a girl. Jews appear twice as frequently as expected from their number in the general population; the Latin races appear less frequently. Scotch, German and English races stand high. Only one Mexican and two mulattoes appear. The group studied by Lewis Ternan and thirteen collaborators was chosen from well within the upper 1 per cent of the school children of the state.—*Nation's Health.*

Carcinoma at Base of Tongue: A case of cancer in an aberrant thyroid at the base of the tongue is reported by Ashhurst and White (*J.A.M.A.*, Oct. 17, 1925). The patient, a man, aged 56, had had a lump on the back of the tongue near the right lower molar teeth for twenty years. It had grown slowly and for about fifteen years had been painful. About two years after it became painful, it was removed, but no record of the case was kept. Three years thereafter, the glands beneath the jaws enlarged, the growth returned and there was pain and difficulty in swallowing. The tumor was continuous with a mass in the floor of the mouth, extending laterally as far as the alveolus and involving the posterior half of the tongue. Operation was undertaken and the lump was burned off the tongue by the electric cautery knife. The mass in the floor of the mouth and the submaxillary masses were untouched. The patient improved rapidly and left the hospital. He was thereafter lost sight of. The pathologic examination revealed lobulated areas of typical thyroid tissue, as well as carcinomatous areas, and a diagnosis of carcinoma of the lingual thyroid was made.

Dental Pathology of the Eskimo: A study of the dental pathology of the Eskimo by R. W. Leigh (*Dent. Cosmos*, September, 1925) is summarized as follows: The Eskimo is a distinct type physically. The caribou, sea mammals and fish constitute his food. The Eskimo is characterized by an overdevelopment of the muscles of mastication, especially the temporalis. There occur comparatively few atypical teeth or instances of dental dystrophy. Malocclusion occurs in 11.4 per cent of skulls; these are almost entirely Class I (Angle) cases. The incidence of dental caries is about 1 per cent. The chewing of skins has produced considerable wear of the teeth and, in old persons, pulp exposure was brought about by this domestic habit. About 19 per cent of skulls evidence one or more periapical abscesses, these abscesses being resultant from abrasion, tooth-fracture or periodontoclasia. Several cases of osteomyelitis, osteoperiosteitis and sinusitis are evident. The Eskimo is afflicted with a high incidence of destructive degeneration of the investing dental tissues.

Digestibility versus Roughage and Vitamins: We must remember also that there is little need for worrying at any time about the vitamins in the diet of an average middle-class American. He will probably get all that he needs even on a smooth diet; and so far as I know, there is as yet no evidence that a superfluity of vitamins makes a man any more healthy than he is when he has just enough for his needs. It may be that they are like other foods and that enough is better for us than a feast. A little knowledge is not always a dangerous thing, but for a conscientious mother it is often a troublesome thing. It makes her stuff her children with a lot of spinach and greens and fruit in an effort to give them more vitamins than they can possibly use. It is doubtless a good thing to train children with good digestions to eat everything that comes to the table, and it may be that the chewing of some of these rougher foods will help the development of their teeth and jaws, but I cannot help feeling that much of our present craze for rough foods is a fad—something which we have taken up eagerly, but without sufficient thought and study. Please do not misunderstand me now and go away saying that Dr. Alvarez is absolutely set against rough diets and uses only smooth ones. If I did that I would be doing just what I have been decrying in some of my confréres. I often prescribe rough diets for those who want to be reduced, for the diabetic or for the constipated, but I always ask first if the individual has ever had trouble with such foods in the past, and I warn him to consult me again if he should develop flatulence and indigestion on the new diet. The message that I leave with you is that we must not ride our hobbies too hard and we must never try to treat our patients all in the same way.—Walter Alvarez, in *Baking Technology.*

Mechanics of Back Strains: Z. B. Adams (*J.A.M.A.*) reviews the mechanics of the joints in the different regions of the spine, in order to show the effect of the shift of their relative positions to one another, on the stress brought on the ligaments, and thus to show where strains usually

occur. The region of the spine in which the strains most commonly occur is the low cervical region. Strains in the thoracic spine are not common. This region is well braced by the ribs. When there are severe distortions, as in scoliosis and in Pott's disease, occasionally there is pain due to strain; but when the deformity develops slowly and is constant, there is surprisingly little pain. At the dorsolumbar junction, one of the most limber spinal sections, there are frequent strains, chiefly in the round and hollow-backed type of person. There are but few cases which show symptoms that can be attributed to the midlumbar spine. The ability to hold the back in the best position to avoid strain certainly depends, to a large degree, on how the body trunk is poised on the feet, knees and hips. First of all, patients should be shod properly, so that the weight is not thrust down on the heads of the metatarsal bones. This does not mean alone the avoidance of high heels, but it means a shoe long enough to avoid pressure of the vamp seam on the metatarsal shafts and heads, preventing their being raised. It means no cramping of the toes. The weight should be carried on the foot in good position, with the arch of the foot held up, and the leg rotated outward, so that the pivots of the knee and ankle are in the same plane; the knees straight, not in hyperextension. This allows the trochanters to be held back and the femoral necks to approach the pelvis, with the normal, forward inclination of 15 degrees, and this forward push props the acetabula upward and forward, and diminishes the possibility of backward tilt of the hip bones and pelvis as a whole. The proper treatment of these back strains involves getting the muscles into condition. At the same time, patients should be trained to stand in the proper position, so that their bones support the weight. The muscles hold them there. When the ligaments have been torn, it is analogous to a sprained ankle, or when badly stretched, to a chronic flat foot, and the cure is not always an easy or rapid process to accomplish. In the acute cases of low back sprain, a surprising amount can be accomplished by adhesive strapping on the skin, to bind the gluteal muscles together and prevent the backward tilting of the pelvis. In the severe cases in which real damage has been done, and the ligaments have to shorten and repair, braces and corsets must be used; but one should not lose sight of the importance of developing the muscles, the anterior abdominal wall, the psoas and gluteii, as well as the quadratus lumborum and erector spinae, and get the skeletal frame into the position in which it can support the weight at the best mechanical advantage. When the back symptoms seem to have developed as the result of a congenitally defective fifth lumbar vertebra, locking of this section of the spine by bone-graft or fusion is necessary to get permanent relief.

Research by School Dentists: Reference will shortly be made to the excellent practical work that is being done by school dentists all over the country, as evidenced by the annual reports of school medical officers for the year 1924. There is another aspect of school dentistry which is of at least equal importance, and that is research. The school dentist sees an enormous number of children in the course of his daily work, and the opportunities thus afforded him for investigating the various pathological conditions that may affect the teeth and mouths of his patients are clearly considerable. Unfortunately, however, there is so much essential practical work to be done for children that few school dentists can spare the necessary time for research work. There is a wide field of usefulness ready to hand, and this fact supplies an additional cogent reason for increasing the numbers of school dental officers.—*Dent. Surgeon.*

Future Progress of Medicine: Medicine should attempt to lead men to extreme old age without suffering, and also to increase their moral and intellectual value, because the quality of the individuals is far more important than their quantity for the happiness and progress of the community. To expect this from medicine does not appear to be asking the impossible when we consider what has already been accomplished. If our civilization does not crumble, and if scientific research goes on at increased speed, we can reasonably believe that our expectations will be fulfilled. The scientifically organized hospitals, the large medical clinics and their multiple laboratories, the institutes for medical research in this country and in Europe, by merely continuing the investigations in which they are at present engaged, will, without any doubt, immensely advance our knowledge of the nature and mechanism of disease. But fundamental principles have to be discovered; entirely new fields must be opened,

and this can be accomplished only by pure science.—Alexis Carrell, in *Scientific Month.*

Pulpless Teeth: Haden asserts that a very high percentage of teeth that are negative in the roentgenogram harbor infection. A fairly large percentage of teeth which were positive in the roentgenogram did not harbor any infection or sufficient infection to be a factor in systemic disease at the time that culture was taken. In such cases, the infection has probably run its course and become bacteria free, just as happens in infections elsewhere in the body. The periapical tissues of a certain percentage of pulpless teeth, either positive or negative in the roentgenogram, are sterile when cultured in glucose brain broth. This does not prove that such are really sterile, since some other method of culture might reveal organisms. The findings suggest, however, that a pulpless tooth is not necessarily infected. The bacteria concerned in chronic foci are quite pathogenic, as judged by their ability to produce lesions in animals on intravenous injection. In selected cases, one can prove an unmistakable tendency of bacteria from chronic foci to localize in certain parts of the body. These cases afford valuable experimental proof of a casual relation of a chronic focus to systemic disease.—*J. Lab.* & *Clin. Med.*, abstr. *J.A.M.A.*

Hygiene of the Mouth: Points to remember: Clean your teeth at night; artificial teeth should be kept as clean as a spoon on the dinner table. Never wear dentures at night. Wires round the necks of teeth are fatal to the teeth. If you use a toothbrush, use three. Hard crusts of bread are good food, a good way of cleaning your teeth, and cheap. Teeth not in use in mastication cannot remain healthy. Don't think because you have no pain you have no dental trouble. Good sound teeth are only possible where the food of the mother and the child contain the necessary lime and other salts, and I would add vitamins. "At birth a child has in its jaws the germs of fifty-two teeth." Feed the mother and the child for the teeth of the man. Have your teeth examined at least twice a year.—Gerard Black, in *Dent. Magazine.*

Orthodontia for the General Practitioner: The general practitioner should be prepared to treat cases requiring simple expansion when it becomes impossible to send the patient to a specialist. The patients of this type who are mouth-breathers with very narrow, constricted arches can be greatly benefited. The general practitioner should avail himself of opportunities for acquiring knowledge and practical methods of diagnosis to enable him to undertake simple cases. The general practitioner possesses sufficient general technical skill to carry on cases requiring simple expansion, but he should spend all the time necessary for a careful diagnosis, bearing in mind that technical skill is always subservient to an accurate, definite diagnosis. A plan must be conceived before it can be executed. The positions of the six anterior teeth depend upon the positions of the first permanent molars. Expansion in the molar region is absolutely necessary in narrow, constricted arches. An adjustment of a number of teeth to be moved individually should be undertaken only with the advice of a specialist. One should not become a slave to an appliance and endeavor to accomplish all kinds of movements with any particular type. The removable Jackson appliance is desirable for accomplishing bilateral expansion. The labial arch wire of 18-gauge is desirable for simple expansion and the movement of one or two anterior teeth. In the hand of the man who understands the fundamentals of orthodontia this appliance is probably the most universally used and can be adjusted to move any teeth in any direction. The general practitioner should not use any appliance requiring the skill of a specialist.—P. N. Williams, in *Dent. Digest.*

Education in Roentgenology: Summary: 1. Roentgenology as a modern specialty is inadequately taught in a large percentage of the medical colleges in the United States. 2. Roentgenology should be recognized as a separate department in all standard medical schools and should have a director of professional rank. 3. The teaching of roentgenology in our medical colleges should be carefully correlated with the other branches, so that the students would receive proportionate and adequate instruction in this specialty. 4. The Class A hospital should assist in the teaching of roentgenology by affording its interns the opportunity to become acquainted with the every day application of its principles. 5. The training of the specialist in roentgenology should be one of the functions of a Class A hospital.—Preston M. Hickey, in *J.A.M.A.*

Announcements

CALENDAR OF MEETINGS

NATIONAL SOCIETIES

American Association of Dental Schools, March 24-26, 1926, Chicago, Ill.

American Dental Society of Europe, April 5-7, 1926, Nice.

American Dental Hygienists' Association, August 23-28, 1926, Philadelphia, Pennsylvania.

American Medical Association, April 19-23, 1926, Dallas, Texas.

American Society of Orthodontists, August 16, 1926, New York City.

International Orthodontic Congress, August 16-20, 1926, New York City.

Pacific Coast Dental Conference, June 21-26, 1926, Portland, Oregon.

Seventh International Dental Congress, August 23-28, 1926, Philadelphia, Pennsylvania.

Canadian Dental Association, August 16-19, 1926, Halifax, N. S.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

National Capital at Washington, D. C., first Tuesday of every month.

February (1926)

Minnesota, at St. Paul (10-12).

March (1926)

District of Columbia, at Washington, D. C. (24-26).

Louisiana, at New Orleans.

April (1926)

Alabama, at Birmingham (5-7).

Connecticut, at Bridgeport.

Kansas, at Wichita (19-21).

Kentucky, at Louisville (5-7).

Michigan, at Detroit (12-14).

New Jersey, at Trenton (14-17).

North Carolina, at Richmond, Va. (13-15).

Texas, at Wichita Falls (20-23).

Virginia, at Richmond (13-15).

May (1926)

Arkansas, at Little Rock (17-19).

Illinois, at Springfield (11-13).

Indiana, at Indianapolis (17-20).

Maryland, at Baltimore (3-5).

Massachusetts, at Boston (3-7).

Missouri, at Jefferson City (17-19).

Montana, at Helena (26-28).

Nebraska, at Lincoln (17-20).

New York, at New York City (19-22).

South Carolina, at Columbia.

South Dakota, at Sioux Falls (11-13)

Southern California (17-20).

Tennessee, at Nashville (4-7).

Vermont, at Burlington (26-28).

West Virginia, at Clarksburg (17-19).

June (1926)

California, at Portland, Oregon.

Colorado, at Colorado Springs (9-12).

Georgia, at Savannah (9-11).

Maine, at Augusta (last week).

New Mexico, at Santa Fe (20).

Oregon, at Portland.

Washington, at Portland, Ore. (8-13).

July (1926)

Wisconsin, at Milwaukee (13-15).

August (1926)

Pennsylvania, at Philadelphia.

October (1926)

Florida, at Daytona.

November (1926)

Arizona, at Phoenix.

Baltimore City Dental Society, February 5-6, 1926.

California State Alumni Chapter, Psi Omega Fraternity at Oakland, California, February 20, 1926.

Central Pennsylvania Dental Society, at Johnston, Pennsylvania, February 22-24, 1926.

Marquette University Dental Alumni Association, at Milwaukee, Wisconsin, February 17-19, 1926.

MEETING OF STATE BOARD OF DENTAL EXAMINERS

Montana, at Helena, July 12-16, 1926. Secretary, Marshall E. Gates, Helena, Montana.

ARKANSAS STATE DENTAL SOCIETY

The Arkansas State Dental Society will meet at the Marion Hotel, Little Rock, May 17-19, 1926.

H. J. CRUME, *Sec'y-Treas.*,
Wilson Bldg., Eldorado, Ark.

GEORGIA STATE DENTAL SOCIETY

The annual meeting of the Georgia State Dental Society will be held in Savannah, Ga., June 9-11, 1926. All ethical practitioners are invited.

G. A. MITCHELL, *Secretary*,
Candler Bldg., Atlanta, Ga.

KENTUCKY STATE DENTAL ASSOCIATION

The fifty-seventh annual meeting of the Kentucky State Dental Association will be held in Louisville, April 5-7, 1926, at the Seelbach Hotel.

W. M. RANDALL, *Secretary*.

VERMONT STATE DENTAL SOCIETY

The fiftieth annual meeting of the Vermont State Dental Society will be held at Burlington, May 26-28, 1926.

LLOYD C. ROBINSON, *Secretary*,
187 College St., Burlington, Vt.

WISCONSIN STATE DENTAL SOCIETY

The Wisconsin State Dental Society will hold its fifty-sixth annual meeting in Milwaukee, July 13-15, 1926.

R. W. HUEGEL, *Secretary*,
104 King St., Madison, Wis.

MONTANA STATE BOARD OF DENTAL EXAMINERS

The Montana State Board of Dental Examiners will meet at Helena, July 12-16, 1926.

MARSHALL E. GATES, *Secretary*,
Helena, Mont.

CANADIAN DENTAL ASSOCIATION

The Canadian Dental Association will hold its next biennial meeting in Halifax, N. S., Aug. 16-19, 1926.

J. STANLEY BAGNALL, *Sec'y-Treas.*,
34 Larch St., Halifax, N. S.

AMERICAN ASSOCIATION OF DENTAL SCHOOLS

The next meeting of the American Association of Dental Schools will be held in Chicago, at the Congress Hotel, March 24-26, 1926.

DELOS L. HILL, *Secretary*,
612 Grant Bldg., Atlanta, Ga.

FLORIDA STATE BOARD OF DENTAL EXAMINERS

The Florida Dental Law which became effective, January 1, 1926, requires annual registration with the secretary of the board of all who hold license in Florida.

R. P. TAYLOR, *Sec'y-Treas.*,
414 St. James Bldg.,
Jacksonville, Fla.

COLLEGE OF DENTISTRY AND ALUMNI CLINIC, IOWA CITY

The College of Dentistry and Alumni Clinic will hold a meeting in Iowa City, Feb. 22-23, 1926. A general clinical program will be presented, and Dr. John G. Meisser, Cleveland, Ohio, will give a paper on "Relation of Dental Infection to Systemic Disease." The discussers will be Drs. Fred M. Smith, professor of internal medicine, College of Medicine, University of Iowa, and John A. Bliss, Sioux City, Iowa. It is requested that hotel reservations be made.

R. A. GREENAWALT, *President*,
Cedar Rapids, Iowa,

R. V. SMITH, *Secretary*,
Iowa City, Iowa.

FIRST INTERNATIONAL ORTHODONTIC CONGRESS

The First International Orthodontic Congress will be held in New York City at the Hotel Commodore, Aug. 16-20, 1926.

Membership in the congress consists of two classes:

Regular membership: This membership can be had only through membership in component societies. It carries the right to vote and hold office. A payment of ten dollars ($10.00) by a recognized orthodontic society and the endorsement of the plan of the congress makes that society a component part of the congress and its members regular members of the congress and entitles the society to a bound copy of the proceedings.

Subscribing membership: This membership is open to all ethical members of the dental and medical professions, irrespective of their membership in the component societies. The dues for this membership shall be ten dollars ($10.00) and shall entitle the member to all the privileges of the scientific session and a bound copy of the proceedings. He shall have no right to vote or hold office unless he is a regular member.

It will be noticed that all members of the dental profession have the privilege of attending the congress after becoming subscribing members. In order for a regular member to receive the bound copy of the proceedings, it will be necessary for him to pay ten dollars ($10.00), the same as a subscribing member.

The Orthodontic Congress is for the advancement of orthodontia as a science and every member is allowed to take advantage of this meeting.

Membership blanks and further information can be obtained from Dr. William C. Fisher, president general, 501 Fifth Avenue, Buffalo, N. Y.

DENTAL SOCIETY OF THE STATE OF NEW YORK

The fifty-eighth annual meeting of the Dental Society of the State of New York will be held at the Hotel Astor, New York City, May 19, 20, 21 and 22, 1926. An important and interesting program will be presented, the essayists and clinicians being men of national reputation.

The society extends a cordial welcome to all members of the American Dental Association.

EDUCATIONAL COURSES

Prior to the regular meeting of the society, three days will be devoted to a series of educational courses, Monday, Tuesday and Wednesday, May 17, 18 and 19, 1926.

Through the courtesy of the University of Columbia and the University of New York, all the courses will be conducted in the college buildings of their dental schools, this affording exceptional opportunity for effective teaching. The following courses and teachers have been selected.

Partial Denture Construction: Teachers: Henry W. Gillett, New York City, wire clasps; George P. Phillips, Boston, Nesbett technic; J. Calvin Woodworth, Chicago, continuous clasps and cast clasps.

Full Denture Construction: Teachers: F. M. Hight, Houston, Texas, articulation; James P. Ruyl, New York City, esthetics; Russell W. Tench, New York City, impressions.

Fixed Bridgework: Teachers: James Kendall Burgess, New York City, inlay attachments; M. Diamond, New York City, carving teeth; T. W. Maves, Cleveland, cavity preparation and inlay abutments.

Removable Bridgework: Teachers: Charles F. Ash, New York City, split bar attachments; L. W. Doxtater, New York City, Peeso and other attachments; Samuel Millard, New York City, Chayes attachments.

Porcelain Work: Teachers: Milton Cohen, New York City, carving and staining; Wil-

liam A. Squires, New York City, shoulder jacket crowns; George A. Thompson, Chicago, shoulderless jacket crowns.

Root Canal Therapy: Teachers: Harry B. Johnson, Atlanta, Ga., Johnston improved Callahan technic; M. L. Rhein, New York City, Rhein technic; R. Ottolengui, New York City, radiography.

Periodontia: Teachers: John Oppie McCall, Arthur Merritt and Paul R. Stillman, all of New York City, periodontic methods for the general practitioner.

Orthodontia: Teachers: Herbert A. Pullen, Buffalo, and J. Lowe Young, New York, theories and practical work within the realm of the general practitioner.

Scientific Removal of Teeth: Teachers: (All from New York City.) M. I. Shamberg, impactions: Douglas B. Parker, elevator technic; Francis S. McCaffrey, forceps technic; Theodor Blum, removal of infected teeth and eradication of foci of infection; Charles Vetter, nitrous oxid and oxygen; Joseph Schroff, pathologic lesions of interest to those who remove teeth; Henry Sage Dunning, accidents and complications in the removal of teeth.

Local Anesthesia: Teachers: Leo S. Stern and Joseph Joffer, New York City. Other teachers will be added if the classes are so large as to require it. The evening sessions will be open to all registered in the exodontia and anesthesia courses. The courses are not restricted to New York State members.

A pamphlet giving details of all the courses, and terms, will be ready for mailing about February 15. For a copy of same, address Edward Kennedy, Chairman Committee on Educational Courses, 347 Fifth Avenue, New York City.

A. P. BURKHART, *Secretary*,
57 East Genesee St., Auburn.

RESOLUTIONS ON THE DEATH OF EDWARD SANFORD GAYLORD

WHEREAS, Almighty God in his infinite wisdom has taken from us our dearly beloved brother, Dr. Edward S. Gaylord, we, the members of the New Haven Dental Association, who have profited so much by the kindly and generous spirit he always showed, sharing as he did his ideals with us and exemplifying them in his everyday work, wish to express our deep and sincere sorrow in his loss; therefore, be it

Resolved, that a copy of these resolutions be forwarded to the bereaved family, a copy of the same be sent to the American Dental Association, a copy made for publication in the several dental journals and a copy to be spread on the minutes of the New Haven Dental Association.

(Signed) DAVID W. JOHNSTON,
ELWYN R. BRYANT,
ALBERT W. CROSBY.

BOOKS RECEIVED

A Textbook of Physiology. By William D. Zoetout, Ph.D., Professor of Physiology in the Chicago College of Dental Surgery (Loyola University) and in the Chicago Normal School of Physical Education. Second Edition, 616 pages, 186 illustrations. Price $4.50. Published by The C. V. Mosby Company, St. Louis, Mo.

The author's long experience as a teacher of physiology amply fits him to write on this most important subject. It is intended chiefly for dental students and those studying pharmacy and normal school work, though the medical student and all those who are interested in hygiene will find much of value in it. The study of physiology becomes fascinating when presented in a simple and practical way, and Professor Zoetout has succeeded in preparing a work which will appeal not only to the student but also to the practitioner.

Ceramics in Dentistry: A Textbook Dealing with the Manipulation of Porcelain, and the Technique and Construction of Porcelain Jacket Crowns for Vital and Pulpless Teeth. By Albert Leland LeGro, D.D.S., Detroit, Michigan. For the past ten years Instructor in the Porcelain Section of the Detroit Dental Clinic Club. With 252 illustrations. 263 pages. Published by Dental Items of Interest Publishing Co., Brooklyn, N. Y.

The author of this book is so well known in his particular field that it is merely necessary to call attention to the publication with the assurance that it will at once command the respect of those who are interested in this work. Porcelain jacket crown construction is rapidly gaining favor with the profession, and this book will go a long way toward standardizing the technic so that it may become more generally applicable. One thing of prime importance emphasized by the author is the necessity of studying natural

tooth forms more carefully, and this same admonition is applicable to those who make filling restorations as well as those who make crowns. Every step in the technic of making porcelain jacket crowns is carefully described in detail and well illustrated, so the reader may conveniently follow it. The book is worthy of the highest commendation, and may be recorded as a distinct addition to the permanent literature of dentistry.

Handbook of Pathology. By C. Y. Wang, M.D., (Edin.), B.Sc. (Vict.), F.R.C.P., (Edin.), Professor of Pathology in the University of Hongkong. New York: William Wood & Co., 1925. 282 illustrations. Pp. 513. Price, $7.00.

PATENTS OF INTEREST TO DENTISTS

1468428. Dental molding apparatus, Amos S. Wells and L. A. Harker, Minneapolis, Minn.

1468731. Apparatus for correcting malocclusion, C. K. Bird and H. B. Washburn, St. Paul, Minn.

1469177. Dental attachment for removable bridges and clasp dentures, Samuel Doskow, New York, N. Y.

1468942. Dental floss holder, Frederick O. Gamble, Memphis, Tenn.

1469004. Amalgam carrier and plugger, Gustav Holtz, Gouldsboro, Pa.

1469049. Dental absorbent-roll holder, Samuel Newman, New York, N. Y.

15691. Reissue, Tooth-cleaning preparation, Carl Pfanstiel, Highland Park, Ill.

1469191. Gold solder, Wm. and H. W. Sheff, Brooklyn, N. Y.

1468888. Toothbrush, A. A. S. Stuart, New Orleans, La.

1469363. Floss ring, Llma G. and W. S. Langley, Youngstown, Ohio.

1469322. Compound for treating Vincent's stomatitis, Oswell W. Lilly, Welch, W. Va.

1469608. Apparatus for preparing anesthetics, Leopold Steiner, New York, N. Y.

1469282. Casting machine, Leon A. Storz, Worcester, Mass.

1469348. Toothbrush, Godfrey Wickberg, Seattle, Wash.

1469992. Dental root canal point, Lewis O. Card, Somerville, Mass.

1469893. Means for selection of artificial teeth, George W. Clapp, New Rochelle, N. Y.

1470162. Sanitary dental handpiece cover, Francis J. Gruss, San Francisco, Calif.

1469841. Adjustable spotlight for dental chairs, Leon Lazar, New York, N. Y.

1469928. Adjustable spotlight for dental chairs, Leon Lazar, New York, N. Y.

1470100. Tool handle, W. R. Porter, Prince Bay, N. Y.

1470129. Toothbrush shield and dentifrice holder, Elmore D. Tichenor, Detroit, Mich.

1470794. Dentifrice, Viggo V. J. Andresen, Copenhagen, Denmark.

147686. Paste-tube cap, Walter W. Carpenter, Charleston, S. C.

1470710. Sanitary toothbrush, Lawrence C. Davis, Cedar Falls, Iowa.

1470826. Impression cast retainer, Wm. M. Gambill, Merkel, Texas.

1470981. Hypodermic needle base, Perry E. Ingalls, Chicago, Ill.

1470698. Therapeutic lamp, Harry W. Nelson, Chicago, Ill.

1471207. Sanitary individual saliva ejector, N. B. Riddle, St. Francisville, La.

1470888. Dental impression tray, Victor C. Smedley, Denver, Colo.

1471081. Vibrating Bucky diaphragm for scattered X-ray radiation, Harry F. Waite, New York, N. Y.

1471019. Anatomical articulator for dental use, Samuel H. Wilson, Glasgow, Scotland.

1471839. Mouth adjuster, Giles T. Epling, Welch, W. Va.

1471785. Orthodontic appliance, Adelbert Fernald, Boston, Mass.

1471626. Toothbrush, Anna M. Pachmayer, Los Angeles, Calif.

1471754. Artificial tooth with anchoring means therefor, A. M. Rosenblum, Chicago, Ill.

1471987. Mucin dissolving agent, C. C. Vogt, Oakmont, Pa.

1472244. Coating, John A. Daly, New Rochelle, N. Y.

1472245. Artificial denture and producing same, John A. Daly, New Rochelle, N. Y.

Copies of the foregoing patents may be obtained for twenty-five cents each, by addressing John A. Saul, Solicitor of Patents, 509 Seventh St., N. W., Washington, D. C.

YOU MUST MOVE, TOO--- OR TAKE "DUST"

By Ernest V. Madison

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